

BETTING ON BLOCKCHAIN

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The use of blockchain technology as a foundation for internet casinos would improve the reliability of online gambling and benefit American-Indian tribes by lowering operating costs of internet casinos and generating more revenue due to an increased customer base. Through the use of blockchain technology, regulators could reliably verify that casino games are fair and that the operators are complying with regulations. Players would benefit from the added security and efficiency of blockchain technology. Casino operators would benefit from lower operating costs leading to increased revenue. With more efficient and reliable regulation American-Indian tribes could legalize online gambling and enjoy the monetary benefits that internet casinos can provide.

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INTRODUCTION

Using blockchain technology as a foundation for internet casinos would (1) improve the reliability of licenses and regulations, (2) better protect players while providing a more efficient overall experience, and (3) benefit American-Indian tribes by generating more business due to a wider range of service and greater trust in well-regulated casinos. Nearly half of the 556 federally-recognized tribes in the United States own and operate casinos.¹ However, most tribes and their casinos are in rural areas with small populations, making it difficult for the tribes to generate significant economic benefits from their casinos.² In fact, “just 16 percent of the tribal casinos—many in urban areas—generate 71.5 percent of the \$31.2 billion industry.”³ This note proposes that online gambling could help those rural tribes to increase their gaming revenue and thus, the benefits to the tribes.

Online gambling is the “fastest growing form of gambling in the world.”⁴ As with traditional brick-and-mortar casinos, some states and tribes already use internet casinos as a means of generating much-needed revenue.⁵ All states and many tribes have issued gambling regulations in some form.⁶

One of the main purposes of gambling regulations is to ensure casino operators’ compliance by auditing the software that operates the games.⁷ This note discusses how blockchain technology would greatly assist in auditing the games’ software. Blockchain technology brings added security and efficiency to internet transactions at a low cost. These combined factors give casino operators and regulators strong incentives to make use of the technology. With lower operating costs and more efficient and

1. William N. Evans & Julie H. Topoleski, *The Social and Economic Impact of Native American Casinos* 1 (Nat’l Bureau of Econ. Research, Working Paper No. 9189, 2002), <https://www.nber.org/papers/w9198.pdf> [<https://perma.cc/22UJ-4SLB>].

2. William Evans & Wooyoung Kim, *The Impact of Local Labor Market Conditions on the Demand for Education: Evidence from Indian Casinos* 3 (Ctr. For Econ. Studies, Working Paper No. 06-14, 2006), https://www3.nd.edu/~wevans1/working_papers/casinos_education_update_1.pdf [<https://perma.cc/P3GC-JCPN>].

3. Dave Palermo, *Why Sports Betting May Not Make Business Sense for Many Tribal Casinos*, LEGAL SPORTS REPORT (Oct. 9, 2017, 11:58 AM), <https://www.legalsportsreport.com/15937/business-sense-for-tribes-and-sports-betting/> [<https://perma.cc/9Q5V-DDT3>].

4. CHRISTINE REILLY & NATHAN SMITH, NAT’L CTR. FOR RESPONSIBLE GAMING, INTERNET GAMBLING: AN EMERGING FIELD OF RESEARCH 1 (2013).

5. Elaine S. Povich, *How Casinos, States Are Winning Big from Online Gambling*, PEW CHARITABLE TR. (June 6, 2017), <https://www.pewtrusts.org/en/research-and-analysis/blogs/stateline/2017/06/06/how-casinos-states-are-winning-big-from-online-gambling> [<https://perma.cc/82YZ-VN6W>].

6. Jonathan Gottfried, *The Federal Framework for Internet Gambling*, 10 RICH. J.L. & TECH. 26, 27 (2004).

7. Benjamin Miller, *The Regulation of Internet Gambling in the United States: It’s Time for the Federal Government to Deal the Cards*, 34 J. NAT’L ASS’N ADMIN. L. JUDICIARY 527, 549 (2014); *Cheating in Online Casinos*, CASINO.ORG, <http://www.casino.org/cheating/> [<https://perma.cc/N8YU-NHZ8>].

reliable regulation, more states and tribes could legalize online gambling and benefit from the revenue.

Part I of this note gives a brief overview of tribal sovereignty, the legality of gambling in Indian country, and the importance of casinos to some tribes. Part II explains the basics of online gambling and its legality within the United States generally. It then discusses current internet casino licensing procedures, which are meant to ensure fairness in games, as well as some difficulties regulators could potentially and do actually face when trying to ensure fairness.

Part III gives an elementary overview of blockchain technology and smart contracts, in order to give the reader a basic understanding of the technology. This will enable the reader to better comprehend Part IV. Part IV argues that blockchain technology would improve the regulation, operation, and overall experience of online gambling. To conclude, it will discuss the benefits to consumers, regulators, operators, and governments.

I. CASINOS IN INDIAN COUNTRY

The legality of gambling in Indian country has a complicated history. According to federal law, gambling is not illegal in the United States, and the individual states retain the power to regulate gambling within their borders.⁸ However, following the Supreme Court's 1987 ruling in *California v. Cabazon Band of Mission Indians*, federally-recognized tribes can operate casinos without state interference because the tribes are sovereign entities.⁹

A. Tribal Sovereignty

American-Indian tribes occupy a unique legal status.¹⁰ The inherent sovereignty of tribes has been recognized by the federal government.¹¹ The legal relationship between tribes and the federal government was defined in a series of Supreme Court cases known as the "Marshall Trilogy."¹² These cases established the legal

8. See *Ah Sin v. Wittman*, 198 U.S. 500, 505–06 (1905).

9. *California v. Cabazon Band of Mission Indians*, 480 U.S. 202, 221–23 (1987) (holding that the state interest in preventing organized crime from infiltrating the high-stakes bingo games on tribal lands did not justify infringement on tribal sovereignty).

10. See *Cherokee Nation v. Georgia*, 30 U.S. 1, 17, 38 (1831) (Marshall, C.J.) (determining that a tribe was not a "foreign nation" for jurisdictional purposes and instead describing tribes as existing "in a state of pupilage" such that "their relation to the United States resembled that of a ward to his guardian").

11. Jenny Bell-Jones, *Recognition of Native American Tribal Sovereignty Is Centuries-Old*, ANCHORAGE DAILY NEWS (Apr. 15, 2017), <https://www.adn.com/opinions/2017/04/15/recognition-of-native-american-tribal-sovereignty-is-centuries-old/> [<https://perma.cc/BS7R-XH75>].

12. *Worcester v. Georgia*, 31 U.S. 515 (1832); *Cherokee Nation*, 30 U.S. 1; *Johnson v. M'Intosh*, 21 U.S. 543 (1823). Professor Charles Wilkinson classified these cases as the

principle that tribes are neither domestic states nor foreign nations,¹³ but “domestic dependent nations.”¹⁴ This means that although tribes are “distinct, independent political communities” and possess internal governmental power over affairs within the tribe, they remain subject to the powers of the federal government.¹⁵

According to the Supreme Court, Congress has plenary power over the affairs of Indian tribes through the Commerce Clause.¹⁶ The Court has interpreted plenary power to mean Congress has exclusive and essentially unchecked authority over Indian tribes.¹⁷ However, the Marshall Trilogy also established that state laws are generally inapplicable to tribes unless explicitly authorized by Congress.¹⁸ The Supreme Court has recognized that tribes have the right to make their own laws and be ruled by them.¹⁹ The Court has also recognized that tribes have the right to regulate economic activity occurring within their borders.²⁰ Therefore, tribes retain many aspects of sovereignty, regardless of their status as “domestic dependent nations.”

B. *The Legality of Tribal Casinos*

In 1987, the Supreme Court reaffirmed the principle that state laws do not apply on tribal land unless explicitly authorized by Congress.²¹ In *Cabazon*, a tribe in California operated a poker room and a bingo parlor on its reservation.²² California officials attempted to shut down these gambling operations because they violated state gambling laws and regulations.²³

The Cabazon Band argued that applying state regulations to tribal activities on tribal land violated the tribe’s sovereignty.²⁴ The Supreme Court agreed.²⁵ The Court further noted that the tribe’s gambling operations provided revenues that were essential to the tribe’s self-sufficiency and economic well-being.²⁶ Thus, the Court held that the federal government’s interest in ensuring tribal self-

“Marshall Trilogy” in CHARLES F. WILKINSON, AMERICAN INDIANS, TIME, AND THE LAW: NATIVE SOCIETIES IN A MODERN CONSTITUTIONAL DEMOCRACY 24 (1987).

13. *Cherokee Nation*, 30 U.S. at 20.

14. *Id.* at 17.

15. *Worcester*, 31 U.S. at 559.

16. *United States v. Lara*, 541 U.S. 193, 200 (2004) (holding that Congress has Congress has “plenary and exclusive” powers “to legislate in respect to Indian tribes”).

17. *See id.* at 199–203.

18. *Worcester*, 31 U.S. at 593–94.

19. *Williams v. Lee*, 358 U.S. 217, 220 (1959).

20. *See Merrion v. Jicarilla Apache Tribe*, 455 U.S. 130, 141 (1982).

21. *California v. Cabazon Band of Mission Indians*, 480 U.S. 202, 207 (1987).

22. *Id.* at 204–06.

23. *Id.*

24. *See id.* at 206.

25. *Id.* at 221–22.

26. *Id.* at 218–19.

government outweighed the state's interest in preventing organized crime from proliferating through gambling operations that are not regulated by the state.²⁷

In response to the Supreme Court's ruling in *Cabazon*, Congress established a regulatory scheme over gambling in Indian country when it passed the Indian Gaming Regulatory Act (IGRA) in 1988.²⁸ Pursuant to IGRA, the National Indian Gaming Commission (NIGC) was created to regulate gambling in Indian country.²⁹

IGRA divided different forms of gambling into three classes, with a regulatory scheme for each.³⁰ Class I (ceremonial or social games for token prizes)³¹ is subject only to tribal regulation, not state or federal.³² Class II (bingo, lottery, poker (games against other players, not the house))³³ is allowed in Indian country only if Class II games are legal in the state in which the tribe is located.³⁴ Class II is subject only to tribal and federal regulation.³⁵ Class III (slots, craps, blackjack, etc.)³⁶ requires (1) that the tribe has eligible trust lands within the state, (2) an agreement between the tribe and state allowing Class III games, (3) approval by tribal ordinance, and (4) approval from the NIGC.³⁷ States must negotiate in good faith with tribes that request an agreement to conduct Class III gaming.³⁸

C. *The Benefits and Importance of Tribal Casinos*

Since the passage of IGRA, tribal casinos, resorts, and other tribal gambling operations have developed into a \$30 billion industry.³⁹ In fact, revenue from tribal gambling operations makes up nearly half of all gambling revenue from the casino industry in the United States.⁴⁰

27. *Id.* at 221–22.

28. *See* 25 U.S.C. § 2701 (2018).

29. *Id.* § 2702.

30. *Id.* § 2710.

31. 25 C.F.R. § 502.2 (2018).

32. 25 U.S.C. § 2710.

33. 25 C.F.R. § 502.3.

34. 25 U.S.C. § 2701(5) (“Indian tribes have the exclusive right to regulate gaming activity on Indian lands if the gaming activity is not specifically prohibited by Federal law and is conducted within a State which does not, as a matter of criminal law and public policy, prohibit such gaming activity.”).

35. *Id.* § 2710(b).

36. 25 C.F.R. § 502.4.

37. 25 U.S.C. § 2710(d).

38. *Id.* § 2710(d)(3)(A).

39. ALAN MEISTER, CASINO CITY'S INDIAN GAMING INDUSTRY REPORT 2 (2017), <https://www.nathaninc.com/wp-content/uploads/2017/04/IGIRSummary2017-reducedsize.pdf> [<https://perma.cc/KE5J-BB42>].

40. *Id.* (“Indian gaming now represents 44.3% of the nationwide casino gaming market, compared to 43.3% for the commercial casino segment and 12.4% for the racino segment.”).

The revenue from tribal casinos improves the lives of the tribal members on the reservations as well as the people in the surrounding communities.⁴¹ After a tribal casino opens, unemployment in the area typically drops due to available jobs at the casino and the increased development of hotels and restaurants that accompany a successful casino.⁴² Tribes with casinos saw their poverty rates fall from 36 percent in 1990 to 27 percent in 2000.⁴³ Mortality rates are falling in areas with tribal casinos, not limited to just the tribal members.⁴⁴

As with almost all economic development, the good also comes with the bad. Not surprisingly, crime rates are up in areas with tribal casinos, but this is mostly due to an increase in auto thefts and larceny, not violent or drug related crimes.⁴⁵ There is also some concern that sex trafficking increases around casinos in general, not limited to tribal casinos.⁴⁶

However, in this case, the benefits from economic development far outweigh the drawbacks. Because of the revenue from casinos and resorts, many tribes now have the economic means to truly exercise their sovereignty and embrace self-determination.⁴⁷ However, as noted above, not all tribes reap the rewards of gambling.⁴⁸ In particular, rural tribes struggle to attract enough customers to generate a profit.⁴⁹ Online gambling could change that, and possibly avoid some of the detriments (increased crime, trafficking) that are associated with brick-and-mortar casinos.

II. ABOUT ONLINE GAMBLING

The current policy of the United States regarding online gambling all but guarantees that foreign governments and foreign companies will continue to reap most of the rewards of online gambling. The Wire Act and the Unlawful Internet Gaming Enforcement Act are the main federal laws that govern online gambling.⁵⁰ The primary concerns that influence policies regarding

41. See Evans & Topoleski, *supra* note 1, at 2.

42. *Id.* at 16, 26, 29–31, 34.

43. Edward Sifuentes, *Study: Casinos Help Indian Tribes Out of Poverty*, SAN DIEGO UNION-TRIB. (Jan. 23, 2005), <http://www.sandiegouniontribune.com/sdut-study-casinos-help-indian-tribes-out-of-poverty-2005jan23-story.html> [<https://perma.cc/96TP-4Q7Y>].

44. Evans & Topoleski, *supra* note 1, at 2, 41–42.

45. *Id.* at 42–43.

46. See Alex R. Trouteaud, *Casinos: Unintended Consequences on Sex Trafficking of Youth*, YOUTHSPARK (Feb. 18, 2019), <http://youth-spark.org/casinos-unintended-consequences-on-sex-trafficking-of-youth/> [<https://perma.cc/3N85-RPGH>].

47. Keith Slack, *Sovereignty and Indian Gaming in the United States*, CULTURAL SURVIVAL Q. MAG., June 1994, <https://www.culturalsurvival.org/publications/cultural-survival-quarterly/sovereignty-and-indian-gaming-united-states> [<https://perma.cc/KMT2-JSYG>].

48. Palermo, *supra* note 3.

49. *Id.*

50. See *supra* Part II.A.

gambling are to protect players and keep operators accountable.⁵¹ The current methods of regulating online gambling pose potential problems of reliability and efficiency.⁵²

A. *The Basics of Online Gambling*

Online gambling is the “fastest growing form of gambling in the world. . . .”⁵³ Globally, it generates more than \$30 billion in revenue each year.⁵⁴ The online gambling market in the United States is expected to exceed \$4 billion by 2020.⁵⁵ This type of gambling comes in many forms: poker, casino games, sports betting, etc. According to a 2010 study conducted for the American Gaming Association (AGA), nearly three thousand online gambling sites are operational in the United States.⁵⁶

According to federal law, online gambling is not illegal in the United States. All states and many tribes have issued gambling regulations in some form.⁵⁷ However, as of 2018, only New Jersey, Delaware, Pennsylvania, and Nevada have legalized online gambling.⁵⁸

The federal government has issued some gambling regulations but may only regulate gambling activity with regard to the states if the activity might cross state or national borders, pursuant to the Commerce Clause of the Constitution.⁵⁹ Using this power, Congress passed several statutes regarding the regulation of online gambling.

In 1961, Congress passed the Wire Act, which prohibits use of any “wire communication facility” to place wagers on “any sporting event or contest.”⁶⁰ After decades of uncertainty, the Fifth Circuit made clear in 2002 that the Wire Act applied only to sports betting, and not casino games.⁶¹ Bolstering the court’s interpretation, in

51. Miller, *supra* note 7, at 529.

52. *See infra* Part IV.

53. REILLY & SMITH, *supra* note 4, at 1.

54. MEISTER, *supra* note 39, at 2.

55. *Online Gambling Market in the US to Exceed USD 4 Billion by 2020, Reports Technavio*, BUS. WIRE (Sept. 21, 2016, 1:43 PM), <http://www.businesswire.com/news/home/20160921005854/en/Online-Gambling-Market-Exceed-USD-4-Billion> [<https://perma.cc/W4NS-KR3Y>].

56. SPECTRUM GAMING GRP., WHITE PAPER: INTERNET GAMBLING DEVELOPMENTS IN INTERNATIONAL JURISDICTIONS: INSIGHTS FOR INDIAN NATIONS 14, 27 (2010), <http://spectrumgaming.com/wp-content/uploads/2018/04/internetgamingwhitepaperfinal-final-october42010.pdf> [<https://perma.cc/7EWP-LGAC>] (“As of June 30, 2010, there were 2,679 Internet gambling websites owned by 665 different companies.”).

57. Gottfried, *supra* note 6, at 27.

58. *Legal US Online Gambling Guide*, PLAYUSA, <https://www.playusa.com/us/> [<https://perma.cc/BHZ7-V4FQ>].

59. U.S. CONST. art. I, § 8, cl. 3 (“The Congress shall have Power. . . . To regulate Commerce with foreign Nations, and among the several States, and with the Indian Tribes.”).

60. 18 U.S.C. § 1084(a) (2018).

61. *In re MasterCard Int’l Inc.*, 313 F.3d 257, 263 (5th Cir. 2002).

2011, the Department of Justice announced that the Wire Act applies only to bets on sports events and races.⁶²

The primary federal legislation regarding online gambling is the Unlawful Internet Gaming Enforcement Act of 2006 (UIGEA).⁶³ The UIGEA does not directly restrict online gambling. The aim of the UIGEA is to police unlawful online gambling activity through the payment systems.⁶⁴

The UIGEA prohibits financial transactions connected to unlawful online gambling.⁶⁵ It calls for the promulgation of rules to prevent the transmission of funds from players to operators for the purpose of unlawful online gambling.⁶⁶ Online gambling is unlawful only if traditional gambling is illegal in the state or tribe in which the online bet is placed or received.⁶⁷ The regulations promulgated pursuant to the UIGEA require payment system providers to block transactions that are prohibited by the statute.⁶⁸

Almost immediately after the passage of the UIGEA, many internet casinos suspended operations in the United States.⁶⁹ Regulation in any industry is accompanied by the possibility that it

62. Whether Proposals By Illinois and New York to Use the Internet and Out-Of-State Transaction Processors to Sell Lottery Tickets to In-State Adults Violate the Wire Act, 35 Op. O.L.C. 1, 1 (Sept. 20, 2011) (“[W]e conclude that interstate transmissions of wire communications that do not relate to a ‘sporting event or contest,’ . . . fall outside of the reach of the Wire Act.”).

63. 31 U.S.C. §§ 5361–5366 (2018).

64. *See id.* § 5361(a).

65. *Id.* § 5363 (

No person engaged in the business of betting or wagering may knowingly accept, in connection with the participation of another person in unlawful Internet gambling— (1) credit, or the proceeds of credit, extended to or on behalf of such other person (including credit extended through the use of a credit card); (2) an electronic fund transfer, or funds transmitted by or through a money transmitting business, or the proceeds of an electronic fund transfer or money transmitting service, from or on behalf of such other person; (3) any check, draft, or similar instrument which is drawn by or on behalf of such other person and is drawn on or payable at or through any financial institution; or (4) the proceeds of any other form of financial transaction, as the Secretary and the Board of Governors of the Federal Reserve System may jointly prescribe by regulation, which involves a financial institution as a payor or financial intermediary on behalf of or for the benefit of such other person.).

66. *Id.* § 5364(a).

67. *See id.* § 5362(10)(a) (

[U]nlawful Internet gambling’ means to place, receive, or otherwise knowingly transmit a bet or wager by any means which involves the use, at least in part, of the Internet where such bet or wager is unlawful under any applicable Federal or State law in the State or Tribal lands in which the bet or wager is initiated, received, or otherwise made.).

68. *Id.* § 5364(a).

69. Heather Timmons & Eric Pfanner, *U.S. Law Causing Turmoil in Online Gambling Industry*, N.Y. TIMES (Nov. 1, 2006), <https://nyti.ms/2TnPWW8> [<https://perma.cc/E7MB-C2KF>].

will impose burdens on an operator and raise costs.⁷⁰ Operators are not likely to participate in a market if it is too highly regulated and the costs of compliance are too much to bear.⁷¹ Furthermore, operators are understandably reluctant to start or maintain internet casinos due to the uncertainty and complexity surrounding the legality of online gambling.⁷² Efforts to repeal the UIGEA have failed, the argument being that the UIGEA is too important to the enforcement of anti-gambling laws.⁷³

This has resulted in a lack of options for players interested in online gambling and leads many to use oft-unregulated online casinos which are based offshore.⁷⁴ Offshore operators have made hundreds of millions of dollars off Americans gambling illegally online.⁷⁵ At a hearing before the House Committee on Ways and Means, former Congressman Jim McDermott noted the staggering data regarding offshore online gambling:

[a]ccording to industry analysts, Americans have this year alone deposited about \$12 billion for offshore online gambling activities. People in the U.S. made somewhere near \$100 billion total wagers online, generating an estimated \$5 billion a year in gross revenues to offshore operators. All these

70. STEVEN TITCH, INTERNET GAMBLING: KEYS TO A SUCCESSFUL REGULATORY CLIMATE 15 (2012), https://reason.org/wp-content/uploads/2012/11/internet_gambling_regulation.pdf [<https://perma.cc/AY5J-2NCZ>] (“[A] balance must be struck: the danger with all regulation is that it will impose burdens and raise costs.”).

71. *Id.* at 11.

72. Mark Antonio, *Internet Gaming and Online Poker Faces Uncertainty Across US*, GAMINGZION (Oct. 9, 2014), <http://www.gamingzion.com/gamblingnews/internet-gaming-and-online-poker-faces-uncertainty-across-us-5922> [<https://perma.cc/83W4-KRDF>].

73. See I. Nelson Rose & Rebecca Bolin, *Game on for Internet Gambling: With Federal Approval, States Line Up to Place Their Bets*, 45 CONN. L. REV. 653, 685 (2012) (citing *The Internet Gambling Regulation: Hearing on H.R. 2267 Before the H. Comm. on Fin. Servs.*, 111th Cong. 5 (2009) (statement of Rep. Bachus, Member, H. Comm. on Fin. Servs.)) (

[S]upporters of the legalization of Internet gambling argue that prohibition has sent Internet gambling underground and left the vulnerable unprotected, but that was the case before [the UIGEA]. The vulnerable were unprotected because companies that tap the American market violated our laws and our protections. No amount of regulation can begin to protect against this particularly predatory and abusive intrusion into American homes No approach to blocking Internet gambling will ever be perfect, but [the UIGEA] is our best hope.)).

74. *Unlawful Internet Gambling Enforcement Act of 2006*, ONLINE GAMBLING SITES, <https://www.onlinegamblingsites.com/law/uigea/> [<https://perma.cc/R73A-87LF>] (

Unregulated internet gambling exploded in the years prior to the passage of UIGEA. . . . The goal [of the UIGEA] was to encourage offshore gambling sites to exit the US market by creating a specific law to punish individuals and companies that processed payments to these entities. . . . [But] [i]t only pushed about two-thirds of the companies out of the US market. It created a black market of unregulated sites that often were not legitimate businesses. Many of the sites that remained in the US market turned out to be scams.).

75. Rose & Bolin, *supra* note 73, at 656.

transactions are underground. None of these activities is regulated and taxed by the U.S. government.⁷⁶

Americans want to gamble online and clearly will do so, regardless of legality. If a more uniform domestic online gambling policy is promulgated, operators will likely initiate more online casinos in the United States. This would give players access to the more reliable domestic sites rather than the largely unregulated offshore market. States and tribes could then benefit from the tax revenue and even operate their own online casinos. This tax revenue could be used to pay for vital public services, including healthcare, education, and infrastructure.⁷⁷

B. *The Purpose of Online Gambling Laws in the United States*

Adequate regulation of online casinos is necessary to protect players and keep operators accountable.⁷⁸ Gambling in general is a highly regulated industry. One of the main purposes of gambling regulation is to ensure the competency of operators.⁷⁹ Governments have a responsibility to consider concerns of cheating, corruption, and addiction with regard to gambling. These concerns must be balanced with the burden that extensive regulations would place on the government.⁸⁰

The most common governmental concern regarding gambling is the potential for casino operations to be infiltrated by organized crime. California even cited this concern in its fight to impose state law and regulations on gambling in Indian country: “[t]he sole interest asserted by the State to justify the imposition of its bingo laws on the Tribes is in preventing the infiltration of the tribal games by organized crime.”⁸¹

76. *Id.* (citing *Tax Proposals Related to Legislation to Legalize Internet Gambling: Hearing Before the House Comm. on Ways & Means*, 111th Cong. (2010) (statement of Rep. McDermott)).

77. AM. GAMING ASS’N, WHEN GAMING GROWS, AMERICA GAINS: HOW GAMING BENEFITS AMERICA (2014), http://www.gettoknowgaming.org/sites/default/files/AGA_EI_Report_FINAL.pdf [<https://perma.cc/GF45-QMCV>].

78. See Miller, *supra* note 7, at 529.

79. *Id.* (citing I. NELSON ROSE, GAMBLING AND THE LAW 29–30 (Gambling Times Inc., 1986) (

Why regulate at all? The standard reasons given are to ensure competency of the operators while keeping organized crime out. Perhaps more important are the twin issues of money and image. . . . And legal gambling is always subject to attack from outsiders; like alcohol, the industry has to be extremely careful about its reputation for causing harm or it can find itself easily outlawed again.)

80. *Id.* (“[S]ome of the most important considerations that lawmakers must balance in regards to gambling laws are: (1) the revenues that gambling generates, (2) the issues of controlling cheating and corruption within gambling frameworks, and (3) the social concerns that legalized gambling promotes.”)

81. *California v. Cabazon Band of Mission Indians*, 480 U.S. 202, 220 (1987).

Part IV of this note discusses how blockchain technology could be used to increase the accountability of casino operators. This would help to prevent the infiltration of casino operations by organized crime.⁸² It would also help to allay the concerns of the public and of government officials that such infiltration might occur.⁸³ Concerns regarding gambling addiction are beyond the scope of this note. However, it should be noted that, despite increased access to both traditional and online gambling, approximately only one percent of Americans have a gambling disorder.⁸⁴

C. *The Current Methods of Regulating Online Gambling in the United States*

Because internet casinos are fairly new and mostly unregulated at the federal level, regulations vary drastically across legalized jurisdictions in the United States.⁸⁵ Before discussing regulation, it is necessary to understand how internet casino games actually work.

Currently, to ensure fairness, internet casinos use pseudo-random number generators to produce results comparable to a randomly dealt live hand or dice roll, depending on the game.⁸⁶ Pseudo-random numbers are not actually random, but only appear to be random.⁸⁷ Pseudo-random number generators are essentially algorithms for generating sequences of numbers that appear random.⁸⁸ The quality of most modern algorithms for producing pseudo-random numbers is so good that the numbers truly appear random.⁸⁹ This makes pseudo-random number generators a good way for players to replicate the experience of gambling in a brick-and-mortar casino. An easy way to understand pseudo-random number generators is to imagine someone first repeatedly rolling a die and making a list of the results. When a player rolls the die in the game, the player simply gets the next number on the list. Thus, the numbers the player rolls appear random, but they are actually predetermined.

82. *See infra* Part IV.A.

83. *See infra* Part IV.A.

84. *Gambling Disorder*, YALE MED., <https://www.yalemedicine.org/conditions/gambling-disorder/> [https://perma.cc/R58K-6ECZ].

85. *See* Brandon James, *Is It Legal to Gamble Online in the USA?*, WIZARD ODS, <https://wizardofodds.com/the-legality-of-online-gambling-us/> [https://perma.cc/9AR2-F7FW] (last updated Nov. 2, 2018).

86. *Are Online Casinos Rigged? We Explore the Facts*, CASINO.ORG, <https://www.casino.org/rigged-casino-guide/> [https://perma.cc/BA7F-35M7].

87. Mads Haahr, *Introduction to Randomness and Random Numbers*, RANDOM.ORG, <https://www.random.org/randomness/> [https://perma.cc/3NLK-BLJN].

88. *Id.*

89. *Id.*

Even though regulations vary between jurisdictions, in order to legally operate an online casino in *any* jurisdiction, an operator must obtain a license.⁹⁰ To obtain a license, the operator must ensure that the games adhere to certain standards of fairness and legality.⁹¹ Fairness is necessary for both legal and business-related reasons. Players are not likely to frequent an internet casino that is known to have games that cheat.

One way regulators strive to ensure fairness and competency in licensed internet casinos is by auditing the software that operates the games.⁹² In this method, operators of internet casinos are required to submit the code for all the games to the regulators.⁹³ The regulators then examine the algorithms of the games to ensure that they are reasonably fair.⁹⁴

If the code passes inspection, then each line is stamped with a unique digital signature.⁹⁵ The digital signature is intended to establish the authenticity of each line of code because digital signatures are difficult to duplicate.⁹⁶ If any line of code for a game is changed without approval, the digital signature would not be valid and would alert regulators to the change.⁹⁷

While the use of a digital signature is quite good and innovative, it still lacks the incorruptible reliability of the blockchain.⁹⁸ The digital signature fails to show regulators the results the algorithm actually produced for players. Without knowing the actual results of the algorithm, regulators are disadvantaged. Regulators can only know what the algorithm is supposed to do, not what it has done. Regulators have to assume that the code will perform in the way that it appears it should. Sometimes a line of code can seem innocent but have nefarious outcomes.

The ability to trace outcomes is essential to ensuring fairness in internet casinos. Fairness is essential to internet casinos having

90. See Ross Cormack, *Acquiring an Online Gambling License*, MEDIUM (Sept. 23, 2017), <https://medium.com/edgefund/acquiring-an-online-gambling-license-27ce717ab4c9> [<https://perma.cc/4AR2-4KKL>].

91. See, e.g., N.J. STAT. ANN. § 5:12-1 (West 2019) (

Legalized casino gaming in New Jersey can attain, maintain and retain integrity, public confidence and trust . . . only under such a system of control and regulation as insures . . . the exclusion or . . . of any persons known to be so deficient in business probity . . . as to create or enhance the dangers of unsound, unfair or illegal practices. . . .)

92. Telephone Interview with Kerry Langan, Spokeswoman, N.J. Div. of Gaming Enft (Nov. 2, 2017) [hereinafter Langan Interview].

93. *Id.*

94. *Id.*

95. *Id.*

96. *Id.*; Haseeb Rabbani, *What Is Hashing & Digital Signature in the Blockchain?*, BLOCKGEEKS <https://blockgeeks.com/what-is-hashing-digital-signature-in-the-blockchain/> [<https://perma.cc/KGF9-WNL4>].

97. Langan Interview, *supra* note 92.

98. See *infra* Part III.

a consumer base and being a viable business opportunity. A strong consumer base is essential to sufficient tax revenue to benefit governments and incentivize those governments to continue to allow online gambling.

III. BLOCKCHAIN TECHNOLOGY

Some say that blockchain technology will change the world,⁹⁹ while others say that blockchain technology is a “solution looking for a problem.”¹⁰⁰ Blockchain technology was introduced to the world in 2008 with bitcoin, a virtual, decentralized currency.¹⁰¹ Bitcoin was “the first application of blockchain technology.”¹⁰² Blockchain technology is the “foundation that supports applications *such as* bitcoin.”¹⁰³ Blockchain technology has potential applications far beyond bitcoin.

A blockchain is essentially an encrypted ledger made up of blocks of information shared across a decentralized network. Muhammad Ahsan Khan explains:

[p]icture a spreadsheet that is duplicated thousands of times across a network of computers. Then imagine that this network is designed to regularly update this spreadsheet and you have a basic understanding of the blockchain.¹⁰⁴

The information is entered only once, removing the duplication that is usually present in ledgers and increasing overall efficiency.¹⁰⁵

When the information is entered into the blockchain, it is converted into an encrypted code called a hash.¹⁰⁶ This method is called hashing, and encryption makes it difficult for the information to be altered after it has been entered.¹⁰⁷ The blockchain self-audits

99. Rob Marvin, *Blockchain: The Invisible Technology That's Changing the World*, PC MAG. (Aug. 29, 2017, 1:38 PM), <https://www.pcmag.me/a/2512097> [<https://perma.cc/6U3K-MYWX>].

100. Jason Bloomberg, *Eight Reasons to Be Skeptical About Blockchain*, FORBES (May 31, 2017, 9:29 AM), <https://www.forbes.com/sites/jasonbloomberg/2017/05/31/eight-reasons-to-be-skeptical-about-blockchain/#4af43a3f5eb1> [<https://perma.cc/DY3N-XSP8>].

101. Marco Iansiti & Karim R. Lakhani, *The Truth About Blockchain*, HARV. BUS. REV., <https://hbr.org/2017/01/the-truth-about-blockchain> [<https://perma.cc/G4TY-TMEH>].

102. *Id.*

103. MANAV GUPTA, BLOCKCHAIN FOR DUMMIES, IBM LIMITED EDITION 1 (Carrie A. Burchfield et al. eds., 2017).

104. Muhammad Ahsan Khan, *Understanding the Blockchain Technology for Beginners*, MEDIUM (Dec. 28, 2017), <https://medium.com/@mahsankhan92/understanding-the-blockchain-technology-for-beginners-21f83901c2e0> [<https://perma.cc/R3S7-Z6E7>].

105. GUPTA, *supra* note 103, at 15.

106. Rabbani, *supra* note 96; *see also* *The Promise of the Blockchain: The Trust Machine*, ECONOMIST (Oct. 31, 2015), <https://www.economist.com/leaders/2015/10/31/the-trust-machine> [<https://perma.cc/KJ2R-N4E9>].

107. Rabbani, *supra* note 96.

by checking that the distributed ledgers are synchronized.¹⁰⁸ Any corruption would be incredibly and instantly obvious.¹⁰⁹ If the hashes do not match up when the blockchain self-audits, the discrepancy is caught immediately.¹¹⁰

Because no centralized database exists, it is nearly impossible for the information on the blockchain to be corrupted.¹¹¹ One problem with centralized systems is the risk to all participants in a network if the central system is hacked.¹¹² With blockchain technology, there are no centralized points of vulnerability that could be exploited.¹¹³

Because of these features, blockchain technology is considered a “trustless” system.¹¹⁴ A “trustless” system does not mean an untrustworthy system, but rather a system in which trust is not necessary.¹¹⁵ Trust is not necessary because of the inherent incorruptible features of blockchain such as a decentralized and self-auditing system.¹¹⁶

IV. HOW BLOCKCHAIN CAN ASSIST IN THE REGULATION OF ONLINE GAMBLING

The technicalities of blockchain make it potentially useful in the regulation of internet casinos as well as many other industries. Blockchain technology is already being tested and used in many different sectors.¹¹⁷

The way it would work for internet casinos relies on the fact that a blockchain network can be permissioned or permissionless.¹¹⁸ On a permissioned blockchain network, network users have a unique identity which restricts their participation on the network and their access to some or all of the ledger information.¹¹⁹ This way, it is possible to create a “members-only”

108. Khan, *supra* note 104.

109. GUPTA, *supra* note 103, at 10.

110. *The Promise of the Blockchain: The Trust Machine*, *supra* note 106.

111. Khan, *supra* note 104; *see also* Tiana Laurence, *Introducing Blockchain*, MINUTEHACK, (Sept. 25, 2017) <https://minutehack.com/guides/introducing-blockchain> [<https://perma.cc/7NLW-H6GT>].

112. GUPTA, *supra* note 103, at 6.

113. Khan, *supra* note 104.

114. Satoshi Nakamoto, *Bitcoin: A Peer-to-Peer Electronic Cash System* (2008) (unpublished manuscript), <https://bitcoin.org/bitcoin.pdf> [<https://perma.cc/TVY9-SJ44>] (“What is needed is an electronic payment system based on cryptographic proof instead of trust, allowing any two willing parties to transact directly with each other without the need for a trusted third party.”); Marvin, *supra* note 99.

115. *Id.*

116. Khan, *supra* note 104.

117. *See* Nolan Bauerle, *What Are the Applications and Use Cases of Blockchains?*, COINDESK (Mar. 16, 2017), <https://www.coindesk.com/information/applications-use-cases-blockchains/> [<https://perma.cc/DT5X-WN68>].

118. GUPTA, *supra* note 103, at 15.

119. *Id.*

blockchain network.¹²⁰ This closed network ensures security and that “members are who they say they are.”¹²¹

Operators of internet casinos could publish game algorithms on the “members-only” blockchain network. “Through the use of IDs and permissions,” the network’s creators would “specify which transaction details they want other [users] to be permitted to view.”¹²² Expanded permissions would be given to regulators, who could then audit the algorithms for the games and ensure fairness.¹²³ Player access would be restricted to protect the secrecy of the algorithms and the fairness of the games.¹²⁴ Obviously, it would not be beneficial to operators to have players know and be able to manipulate a game’s algorithm.

To further ensure security and fairness, as is already done in some jurisdictions, a digital signature could be used to “stamp” the code.¹²⁵ This signature could then be published on the blockchain. Thus, the signature could not be corrupted or faked by an unlicensed casino operator.¹²⁶

Smart contracts could also be used to increase reliability in payouts to players. Smart contracts can be entered as code into the blockchain and will automatically execute when the conditions of the contract are met.¹²⁷ A common problem players have when using internet casinos is the failure of the casino to issue payouts in a timely fashion.¹²⁸ In some instances, the casino fails to even issue payouts at all.¹²⁹ In addition, many internet casinos require players to leave large deposits and upload money to a casino wallet to use for betting.¹³⁰ Getting this money back can sometimes take days.¹³¹

Smart contracts could be written into the blockchain to ensure that payouts are processed automatically and instantly upon the satisfaction of the specified conditions in the smart contract. If

120. *Id.* at 10.

121. *Id.*

122. *Id.*

123. *See id.*

124. *See id.*

125. *See supra* Section II.C.

126. Khan, *supra* note 104. Unlicensed operators are a real danger and the regulation of internet gambling will not be very effective unless these unlicensed operators are completely and clearly excluded. *See* DAVID O. STEWART, ONLINE GAMBLING FIVE YEARS AFTER UIGEA 3 (2011).

127. *See Smart Contracts: The Blockchain Technology That Will Replace Lawyers*, BLOCKGEEKS (Oct. 9, 2016), <https://blockgeeks.com/guides/smart-contracts/> [<https://perma.cc/4V4E-FRB8>].

128. *See Payment Issues*, ASK GAMBLERS, <https://www.askgamblers.com/casino-complaints/payment-issues> [<https://perma.cc/GC2C-C2TA>].

129. *See id.*

130. Dean Takahashi, *FunFair Is Making Fair, Transparent, and Fast Online Casino Games Based on Ethereum*, VENTUREBEAT (July 16, 2017, 8:35 AM), <https://venturebeat.com/2017/07/16/funfair-is-making-fair-transparent-and-fast-online-casino-games-based-on-ethereum/> [<https://perma.cc/S2NV-GVLF>].

131. *Id.*

players can be sure that the money they upload is safe and quickly retrievable, they will likely gamble more frequently and with larger sums.¹³² Increased player activity would increase profits and revenue to internet casino operators and state and tribal governments.

In sum, using a blockchain network would make the internet casino's entire system completely transparent to regulators and thus more reliable. Regulators could ensure that casino operators have not altered information. The entire network must agree that all of the information is valid.¹³³

Players can be sure that the games are fair and that licensed casinos are reliable venues for their money. Operators benefit whenever regulators and consumers are happy. Happy consumers lead to increased business and profits. Happy regulators mean no roadblocks to operations. Furthermore, through the use of permissions and cryptography, casino operators can comfortably publish their algorithms without fear of exposure.¹³⁴ As mentioned above, operators would only be open to this method if they can be sure that their information and algorithms will remain secure and confidential.

A. *The Benefits of Blockchain Technology to Tribes and States*

With lower operating costs and more efficient and reliable regulation, more tribes and states could legalize online gambling and benefit from the increased tax revenue generated from internet casinos. Many tribes are desperate for additional revenue, particularly those that are lacking in sufficient natural resources to exploit to generate revenue. One of the stated purposes of IGRA is to provide "a means of promoting tribal economic development, self-sufficiency, and strong tribal governments."¹³⁵

Currently, only a small number of gaming tribes, typically those near urban areas, generate most of the revenue from tribal brick-and-mortar gaming.¹³⁶ Some argue that greater proliferation of legalized internet gambling would actually be detrimental to tribes that rely on revenue from traditional gambling in brick-and-

132. Nerilee Hing et al., *Maintaining and Losing Control During Internet Gambling: A Qualitative Study of Gamblers' Experiences*, 17 *NEW MEDIA & SOC'Y* 1075, 1089 (2015) ("Surveys have also revealed that 10–20% of internet gamblers agree that using digital money tends to increase their gambling. . . .").

133. GUPTA, *supra* note 103, at 7, 11, 16.

134. *Id.* at 11, 22.

135. 25 U.S.C. § 2702(1) (2018).

136. Palermo, *supra* note 3 ("Just 16 percent of the tribal casinos – many in urban areas – generate 71.5 percent of the \$31.2 billion industry, according to senior economist Alan Meister of Nathan Associates.").

mortar casinos.¹³⁷ To the contrary, internet casinos could greatly expand the customer base and revenue of those tribes as well as the more rural tribes who currently do not realize much profit from their brick-and-mortar casinos. Furthermore, tribes that pursue internet gambling do not have to close down their brick-and-mortar casinos, but rather they can operate both, adding to the current revenue.

Blockchain-based casinos would make it more feasible for tribes and states to enter into the online gambling market by lowering the cost of operation. Tribes and states that cannot afford the presently high costs of regulating internet casinos are not currently inclined to legalize online gambling within their borders. Understandably, they do not want to embark on an endeavor that they cannot adequately regulate and secure for their citizens and members.

One consequence of the current lack of gambling legalization is the lost potential tax revenue from internet casinos. Every tribe and “state that has legal gambling collects taxes or fees from it.”¹³⁸ Tax revenue from gambling in the United States has generally remained flat or has slightly declined, but revenue from online gambling has been increasing.¹³⁹ In addition, public support for casinos and gambling is at an all-time high.¹⁴⁰ Americans want to gamble online and are finding ways to do so.¹⁴¹ Offshore operators have made billions of dollars off of Americans gambling illegally online,¹⁴² and it has been estimated that Americans spend more

137. See *U.S. Department of Justice Opinion on Internet Gaming: What’s at Stake for Tribes?: Hearing Before the S. Comm. on Indian Affairs*, 112th Cong. 3 (2012) (statement of Robert Odawi Porter, President, Seneca Nation of Indians) (

[The] common interests [of the Seneca Nation and its neighbors in New York] are to protect local jobs and local commerce that will create more local jobs. Internet gaming, if not tied to local facilities and local operations that trade in ancillary local entertainment and local commerce, does not create local jobs and local economic activity within a State. Internet gaming, if it is not controlled locally, and connected to local commerce, will bleed dry the regions surrounding Indian Country and cause great injury to all of us who depend upon our existing businesses.).

138. Povich, *supra* note 5.

139. *Id.* (summarizing and comparing tax revenue of online and brick-and-mortar gambling in several states).

140. AM. GAMING ASS’N, *VOTERS VIEW CASINO GAMING MORE FAVORABLY THAN EVER BEFORE* (2014), https://www.gettoknowgaming.org/sites/default/files/AGA_G2KG_ExecutiveSummary_natlpoll_2.pdf [<https://perma.cc/9RC3-N57A>] (“Public support of casino gaming is at an all-time high (57%), with nine-in-ten (87%) voters across political lines stating that gambling is an acceptable activity.”).

141. Rose & Bolin, *supra* note 73, at 655 (“Opponents [of online gambling] have compared online gambling to crack cocaine, but it has also been described as inevitable and unstoppable.”).

142. *Id.* (“Americans have made Internet bets in the hundreds of millions of dollars to the benefit of offshore illegal and gray market operations.”).

than \$4 billion each year on online gambling.¹⁴³ States and tribes ought to get a slice of that pie.

In addition to the tax revenue, widespread legalization of online gambling would almost certainly create jobs and generate economic activity, according to data from increased legalization of traditional gambling.¹⁴⁴ Increased tax revenue enables a tribe to more fully embrace self-determination and invest in education, infrastructure, health care, and any other sort of investment a tribe deems lucrative.¹⁴⁵ This sort of government investment would create more jobs, whether they be in construction, new health centers, schools, etc. This factor is particularly important to tribes, because the unemployment rate on reservations remains higher than the national average.¹⁴⁶ Increased revenue and more jobs for constituents are two factors that can typically influence legislators.

Furthermore, tribes and states would be helping their citizens by presenting them with more reliable and trustworthy internet casinos. Currently, most online gambling by Americans is through offshore companies, which are not subject to United States gambling regulations.¹⁴⁷ Players have no recourse if they are scammed by offshore companies. Players have no way of regaining stolen money or quickly accessing funds that have been uploaded to untrustworthy or inefficient online casinos.¹⁴⁸ If more domestic internet casinos were permitted, players would likely frequent the more reliable domestic sites rather than the largely unregulated offshore market, particularly if the domestic internet casino had the added regulatory protection of blockchain technology.

143. STEWART, *supra* note 126, at 1.

144. See AM. GAMING ASS'N, GAMING'S QUARTER OF A TRILLION DOLLAR IMPACT ON THE U.S. ECONOMY (2014), https://www.gettoknowgaming.org/sites/default/files/AGA_G2KG_Fact-Sheet_0.pdf [<https://perma.cc/HPK2-79FU>] (stating that “[c]asinos are one of the largest recreational employers in America, . . . support[ing] more than 1.7 million jobs throughout the economy” and estimating that “the U.S. gaming industry contributes nearly \$240 billion to the national economy”).

145. *Taxation*, NAT'L CONG. AM. INDIANS, <http://www.ncai.org/policy-issues/tribal-governance/taxation> [<https://perma.cc/QUY5-CR6V>].

146. Shelly Hagan, *Where U.S. Unemployment Is Still Sky-High: Indian Reservations*, BLOOMBERG (Apr. 5, 2018, 10:30 AM), <https://www.bloomberg.com/news/articles/2018-04-05/where-u-s-unemployment-is-still-sky-high-indian-reservations> [<https://perma.cc/4FWP-PMPX>] (“Of 27 counties with a majority American Indian or Alaska Native population, about two-thirds had unemployment rates [in 2017] above the national level, with nine at 10 percent or higher. That compares with the national jobless rate of 4.1 percent in February [2018].”).

147. STEWART, *supra* note 126, at 2, 4 (stating that “in 2010, global revenue for online gambling was nearly \$30 billion, and less than 15 percent came from the U.S.” and arguing that “[Congress] should reinforce law enforcement tools and proscriptions to protect Americans from gambling websites that now operate from offshore jurisdictions with minimal or no regulation”).

148. *Why Gambling at Offshore Online Casinos is a Very Dangerous Play*, NJ ONLINE GAMBLING, <https://www.njonlinegambling.com/illegal-offshore-casinos/> [<https://perma.cc/9JXM-YWMC>] (“Unregulated sites have also been notorious for: . . . Voiding winnings and not paying large jackpots altogether. . . . Predatory deposit bonus terms and conditions meant to dissuade customers from cashing out. . . .”)

B. *The Benefits of Blockchain Technology to Regulators*

The use of blockchain technology as a foundation for internet casinos would also improve the reliability of casino licenses and regulations. As mentioned above, the use of blockchain-based casinos would make it easier for regulators to monitor the code behind internet casino games and transactions. Regulators could reliably verify that games are fair and that the casino operator is complying with regulations by simply reviewing the ledger. This simplicity would save time and money and increase overall administrative efficiency. Indeed, one of the stated priorities of the NIGC is to “[e]ngage in sound regulation without unnecessarily stymieing the entrepreneurial spirit of tribes.”¹⁴⁹

More effective, while simultaneously less burdensome, regulation would most likely be welcomed by all interested parties. Typically, the most cost-effective, reliable, and secure method of regulation is the optimal method. It is reasonable to believe that taxpayers will typically want their tax dollars to be spent on the best, lowest-cost option available. Blockchain technology offers this more reliable, lower-cost option to regulators.

C. *The Benefits of Blockchain Technology to Players*

The use of blockchain technology as a foundation for internet casinos would better protect players while providing them with a more efficient overall experience. Players’ main interests regarding internet casinos are fairness, efficiency, and reliability. Blockchain technology brings added security and efficiency to internet transactions and would greatly improve the security and efficiency of internet casinos. More robust protections allow players and casino operators to cut out costly and inefficient middlemen.¹⁵⁰

As noted above, one common problem players have when using internet casinos is failure of the casino to issue payouts in a timely fashion or, in some instances, to even issue payouts at all.¹⁵¹ Players deserve fast, trustworthy, and transparent payment systems. The use of blockchain technology and smart contracts would easily remedy this issue.

Smart contracts could be written to ensure that bets and payouts are processed automatically and instantly upon the satisfaction of specified conditions. The use of smart contracts could eliminate the need for the operator or any third party to process the bets or payouts. Removing the need for a third party reduces the

149. *Principles and Priorities*, NAT’L INDIAN GAMING COMM’N, <https://www.nigc.gov/commission/principles-and-priorities> [https://perma.cc/52EZ-SCV8].

150. See Khan, *supra* note 104.

151. *Payment Issues*, *supra* note 128.

costs for operators and, consequently, leads to higher payouts for consumers.¹⁵²

D. Some Drawbacks of Blockchain Technology

Blockchain is a relatively new technology, and its application outside of cryptocurrencies has yet to be fully tested, although that is quickly changing.¹⁵³ Some argue that blockchain technology is not worth the hype.¹⁵⁴ Blockchain technology is considered by some to be a “very technical solution to a very specific problem.”¹⁵⁵ Amidst all of the press and hype surrounding cryptocurrencies, it is easy to see how some are tempted to pigeonhole blockchain technology.

One strong and valid argument against the use of blockchain technology in general is the amount of computing power necessary for the blockchain to self-audit.¹⁵⁶ For example, processing a single bitcoin transaction consumes more than 5,000 times the energy used to process a single credit card transaction.¹⁵⁷ The security and transparency of the blockchain relies on the blockchain network being able to check in with itself.¹⁵⁸ This allows it to verify the validity of the ledger.¹⁵⁹

However, all blockchain networks do not necessarily have to operate in exactly the same manner as the bitcoin blockchain.¹⁶⁰ Remember that bitcoin is just one early application of blockchain technology. Additionally, projects aiming to reduce the cost and energy needed to use blockchain technology are underway across

152. GUPTA, *supra* note 103, at 9.

153. See Bauerle, *supra* note 117.

154. See, e.g., NAT'L INST. OF STANDARDS & TECH., NISTIR 8202, BLOCKCHAIN TECHNOLOGY OVERVIEW 43 (2018), <https://nvlpubs.nist.gov/nistpubs/ir/2018/NIST.IR.8202.pdf> [<https://perma.cc/DXU4-BL2Y>]; Tom Espiner, *Is Blockchain Living Up to the Hype?*, BBC (Oct. 23, 2018), <https://www.bbc.com/news/business-45919700> [<https://perma.cc/T4F4-NDSS>] (listing various critiques of blockchain); Morgan E. Peck, *Do You Need a Blockchain?*, IEEE SPECTRUM (Sept. 20, 2017), <https://spectrum.ieee.org/computing/networks/do-you-need-a-blockchain> [<https://perma.cc/4KLR-V6BB>] (discussing the pros and cons of blockchain and ending with “you should also consider the possibility that you don’t need a blockchain at all”); Steve Wilson, *Blockchain: Almost Everything You Read Is Wrong*, CONSTELLATION RES. (May 3, 2016), <https://www.constellationr.com/blog-news/blockchain-almost-everything-you-read-wrong> [<https://perma.cc/76S8-747F>] (arguing that blockchain is overhyped and that it is merely a decentralized way to verify entries into a ledger).

155. See, e.g., Wilson, *supra* note 154.

156. Lucas Mearian, *What Is Blockchain? The Complete Guide*, COMPUTERWORLD (Jan. 29, 2019, 4:13 PM), <https://www.computerworld.com/article/3191077/security/blockchain-the-complete-guide.html> [<https://perma.cc/B2CH-9VYR>] (“For example, the bitcoin blockchain harnesses anywhere between 10 and 100 times as much computing power as all of Google’s serving farms put together.”).

157. Christopher Malmo, *A Single Bitcoin Transaction Takes Thousands of Times More Energy than a Credit Card Swipe*, MOTHERBOARD (March 7, 2017), https://motherboard.vice.com/en_us/article/ypkp3y/bitcoin-is-still-unsustainable [<https://perma.cc/3DSG-ZFN6>].

158. See *supra* Part III.

159. See *supra* Part III.

160. See GUPTA, *supra* note 103, at 14.

the globe.¹⁶¹ Private blockchain networks (those that use permissions) do not require the same amount of computing power as a public blockchain network, such as the one that powers bitcoin.¹⁶² If governments and casino operators teamed up to share blockchain networks, the required computing power could be generated from multiple sources and the burden could be shared among the interested parties.

Another notable worry about the blockchain network is its alleged vulnerability to hacking. It is impossible to say with absolute certainty that a blockchain network cannot be hacked. However, its double protections of encryption and decentralization make it almost completely impervious to hacking.¹⁶³ Recent security breaches related to blockchain apparently stemmed from vulnerabilities in technology connected to the blockchain and not the blockchain technology itself.¹⁶⁴

Furthermore, no internet casino, or really any internet operation, can presently be completely impervious to hacking. However, the encryption and decentralization of a blockchain network make it one of the most secure technologies available.¹⁶⁵

CONCLUSION

In conclusion, the use of blockchain technology as a foundation for internet casinos would (1) improve the reliability of casino licenses and regulations, (2) better protect players while providing a more efficient overall experience, and (3) benefit tribes and states by lowering costs and generating more business due to an increased customer base and public trust in casinos.

Because most tribes and their casinos are in rural areas with small populations, it can be difficult for the tribes to generate significant economic benefits from their casinos.¹⁶⁶ Online gambling could help those rural tribes to increase their gaming revenue and thus the benefits to the tribes.

161. Jan McGirk, *Is Blockchain Energy Use Sustainable?*, CHINADIALOGUE (Apr. 26, 2018), <https://www.chinadialogue.net/article/show/single/en/10606-Is-blockchain-energy-use-sustainable-> [<https://perma.cc/S3WW-2MMV>].

162. CoinBundle Team, *Compare Public and Private Blockchains: Blockchain Networks Explained*, MEDIUM (Sept. 24, 2018), <https://medium.com/coinbundle/for-beginners-compare-public-and-private-blockchains-1b048d2d89c3> [<https://perma.cc/XVP7-P7DV>] (

One of the biggest drawbacks of a public blockchain is the significant amount of computational power that's necessary to maintain a distributed ledger at such a large scale. . . . Additionally, since private blockchains are almost always smaller than public blockchains, they take up a lot less energy and power consumption doesn't usually become an issue.)

163. Marvin, *supra* note 99.

164. *Id.*

165. *Id.*

166. Palermo, *supra* note 3.

In addition, because online gambling is the “fastest growing form of gambling in the world,”¹⁶⁷ it is vital that governments have an efficient and reliable means of ensuring the fairness of the algorithms controlling the games. Competent regulation of online gambling is necessary to protect players and keep operators accountable.¹⁶⁸ Blockchain technology would provide these means to make it easier for regulators to monitor internet casino games and transactions. Auditors could verify more reliably that games are fair and that the casino operator is complying with regulations by simply reviewing the ledger. With lower operating costs and more efficient and reliable regulation, more states and tribes could legalize and benefit from the revenue generated by internet casinos.

167. REILLY & SMITH, *supra* note 4.

168. *See* Miller, *supra* note 7, at 529.