Blockchain & Smart Contract Technology: Alternative Incentives for Legal Contract Innovation

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I. INTRODUCTION

As technology becomes more embedded in society, customer expectations of both the cost and quality of services have changed dramatically. While the legal industry has historically been resistant to such innovation, mounting pressure to lower costs is driving legal professionals to increasingly leverage the benefits of technology. With a focus on lowering the cost of legal services, very few commentators have expressed concern about maintaining or improving the quality of legal services. In a recent academic work, however, prominent legal scholar George Triantis explores the question of whether law firms can simultaneously improve legal contract quality while reducing the costs of creating such. Triantis argues that improving contract quality, rather than simply reducing cost, will help lawyers more effectively respond to economic pressures and changing technologies. Triantis outlines several barriers to innovation that exist within the legal industry and explains how limited intellectual property rights are especially cumbersome to the effort.


2. See CLAYTON M. CHRISTENSEN & MICHAEL E. RAYNOR, THE INNOVATOR’S SOLUTION: CREATING AND SUSTAINING SUCCESSFUL GROWTH (2003). According to Clayton Christensen’s model, cost-cutting mechanisms regarding document production are considered disruptions and are likely to result in broadening access to legal services. Law firms, however, appear to be underinvesting in innovations that would increase quality due to structural obstacles and the absence of a methodology for valuing transactional legal services. See id.


5. See Triantis, supra note 3, at 194–97, 195 n.40 (“There appear to be no valid grounds why legal forms such as contracts, insurance policies, pleadings, and other legal documents should not be protected under the law of copyright.” (quoting 1-2 MELVILLE B. NIMMER & DAVID NIMMER, NIMMER ON COPYRIGHT § 2.18)); Gerald F. Davis & Heinrich R. Greve, Corporate Elite Networks and Governance Changes in the 1980s, 103 AM. J. SOC. 1, 2–3 fig.1 (1997).
innovation through collaborative contract design strategies like standardization and modularity.  

II. EXECUTIVE SUMMARY

This Note considers whether alternative means exist to incentivize contract innovation in the marketplace, even in the absence of intellectual property rights. More specifically, the following analysis evaluates whether smart contract and blockchain technology can incentivize contract innovation. The research is designed to assist business lawyers and executives looking to leverage these technologies and is organized as follows. Part III provides a brief overview of the business model of transactional legal services, economic pressures facing the industry, and barriers to contract innovation. The section then reviews George Triantis’ recent academic work, in which he argues that improving contract quality through collaborative design best positions legal professionals to overcome barriers to innovation within the industry, despite increased pressure to reduce costs. Part IV provides a foundational background to smart contracts and distributed ledger technology (DLT). The Part then examines the benefits and drawbacks of each to illustrate the legal industry’s reluctance to adopt the technology to assist contract development and improvement. Part V hypothesizes that commercial entities leveraging smart contract and distributed ledger technology may be in a stronger position than law firms to capture financial returns from contract innovation—effectively reducing a party’s reliance upon transactional lawyers to create contracts—since their business models inherently insulate returns from competitors and eliminate many of the traditional barriers to innovation found in the legal industry. Part VI illustrates this alternative method for contract innovation through a case study featuring IBM and its effort to leverage smart contracts and distributed ledger technology through the IBM Watson IoT Platform and Blockchain. Part VII considers the impact such technology is having on the marketplace.

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and whether proprietary contract platforms, like the IBM Watson IoT Platform and Blockchain, promote or inhibit consumer welfare.

III. BARRIERS TO CONTRACT INNOVATION

At the heart of business dealings is the natural language agreement—an agreement with specific terms between two or more persons or entities in which there is a promise to do or refrain from doing something in return for a benefit of value, known as consideration. Such agreements are the traditional way to formalize a business relationship and serve as “the basic building block of [the] market economy.” The primary role of transactional lawyers is to facilitate secure transfers of assets and allocations of risk through the creation and enforcement of these agreements. In a recent academic work, George Triantis outlines the value these lawyers provide in contractual dealings and discusses the innovations acting upon the transactional legal practice.

A. Stages of Contract Development

More specifically, Triantis observes that lawyers service clients across three distinct contracting stages, which he classifies as: “front-end, midstream, and back-end.” During the front-end stage of contracting, lawyers “design, draft, and negotiate” contracts. Most frequently, lawyers utilize standard contract terms not only to reduce the costs of contract development but

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7. See Triantis, supra note 3, at 183.
10. Id.
12. Triantis, supra note 3, at 183.
also to increase the value of terms through network effects. Alternatively, lawyers may customize terms to the specific needs of their clients or even create innovative terms that improve contract quality. Triantis makes an important distinction, however, between customization and innovation of contract terms. He defines customization as the “one-time tailoring of a contract term to a specific transaction and client.” Only in rare cases is such customization or innovation a cost-effective approach to transacting. Thus, lawyers should consider the high costs often associated with departure from a standardized term relative to the mere incremental value of including a more customized term. Innovation, on the other hand, is defined as the “creation of a new term that can be redeployed in other transactions and potentially standardized.” Thus, innovation refers to improvements to contracts that are more significant in degree than customization.

Once a contract is finalized, the midstream stage begins, during which each party is expected to perform their respective promises according to the terms of the contract. Exact and complete performance by both parties discharges the contract and relieves parties from further legal obligations. To avoid inadvertent breaches or performance beyond the contract requirements, parties to the transaction must remain aware of and integrate the terms of the contract into their business practices. Contract obligations are frequently overlooked and unwittingly modified during this stage, which demands active monitoring and management of the contract.

15. Triantis, supra note 3, at 183–84.
16. Id. at 192.
17. Id. at 183–84; see also THOMAS D. MORGAN, THE VANISHING AMERICAN LAWYER 89–91, 114 (2010); Jayanth K. Krishnan, Outsourcing and the Globalizing Legal Profession, 48 WM. & MARY L. REV. 2189, 2204 (2007).
18. Triantis, supra note 3, at 183–84.
19. Id. at 192.
20. Id. at 184.
21. Id.
to ensure proper performance. Active contract management is especially important for business entities that maintain a high number of contractual relationships with multiple parties.

The back-end stage of contracting occurs after a contract is terminated or breached. If a breach or other contract dispute arises, lawyers intervene on behalf of their clients through various tools of legal action (e.g., arbitration, mediation, litigation, settlement negotiations).

### B. Pressure on the Legal Industry to Reduce Costs

Across these stages of contract development, the legal industry continues to face tremendous pressure to reduce costs. Many clients are seeking more cost-efficient services and are opting to disaggregate their expensive legal needs across a variety of providers in the effort. Other clients are allocating certain components of transactional work to non-lawyer providers since doing so often results in even more significant cost savings. Legal professionals have responded to these pressures by focusing time and attention almost exclusively on cost reduction through methods like increased standardization and document automation.

23. Triantis, supra note 3, at 184.
24. Id.
25. Id.
27. Many legal tasks once performed solely by attorneys are being outsourced to more cost-effective legal service providers, automated through technology solutions, swallowed by in-house corporate legal departments, or made available for free to low-revenue clients in hopes of eventually transitioning them to a paid client at a later date (e.g., Cooley LLP’s launch of the CooleyGo platform—a mobile-friendly microsite that provides a range of free legal and business content to start-ups with formation, financing, team building, intellectual property, M&A, etc.). Cohen, supra note 26; COOLEYGO, https://www.cooleygo.com/ (last visited Feb. 8, 2020). Not surprisingly, purchasers of legal services—not law firms themselves—are driving this industry change. Cohen, supra note 26.
29. Id.
30. Id. at 192.
As professional services, like contract development, become more standardized—meaning, they are “simple enough to be used by individuals with relatively little training and the procedures themselves can be sold to end users as commodities”—the services naturally drift toward cheaper and less prestigious market sectors, effectively becoming commoditized.\textsuperscript{31} In other words, successfully reducing costs through standardization often results in greater commoditization of law firm services.\textsuperscript{32} Clients subsequently become accustomed to paying for less expensive commoditized offerings and, in turn, question the value of returning to a higher price point.\textsuperscript{33} With such inexpensive commoditized services available, law firms face an increased challenge of persuading clients of the value of customized or “premium” legal services.\textsuperscript{34}

Despite this emphasis on lowering the costs of transactional legal services, few have expressed concern about maintaining or improving the quality of contracts through innovation.\textsuperscript{35} Triantis is one of a few academics raising this issue. He argues that developing new ways to improve the quality of transactional services will help lawyers redesign their business models to more effectively respond to industry pressures and emerging technologies.\textsuperscript{36} While innovation\textsuperscript{37} is central to improving the quality of contracts, Triantis maintains that several barriers impede such innovation in the legal industry.\textsuperscript{38} These barriers include the customary deployment of standardized contract terms

\begin{itemize}
  \item \textsuperscript{31}Id. at 201; see also What the Future Legal Market Means for Lawyers and Bar Associations, ABA, https://www.americanbar.org/groups/bar_services/publications/bar_leader/2012_13/july_august/what_future_legal_market_means_lawyers_bar_associations/ (last visited Feb. 8, 2020).
  \item Triantis, supra note 3, at 185; see also Nanda, supra note 26, at 6–10; Thomson Reuters, Don’t Be Commoditized: How to Rise to the Top as the Competition Races to the Bottom, ATTORNEY AT WORK (July 20, 2018), https://www.attorneyatwork.com/lawyers-dont-be-commoditized/.
  \item Triantis, supra note 3, at 202.
  \item Triantis, supra note 3, at 192.
  \item Id. at 179–80.
  \item Id. at 179–80.
  \item Id. at 179–80.
\end{itemize}
without change,\textsuperscript{39} the limited intellectual property protection available to drafters of novel contract language,\textsuperscript{40} market resistance to the adoption of novel terms,\textsuperscript{41} and structural features of legal entities that value client service over innovation, etc.\textsuperscript{42}

\textbf{C. Standardization of Contract Terms}

A primary barrier to contract innovation is the tension between capturing the benefits associated with deploying standardized contract terms and encouraging their improvement.\textsuperscript{43} Contracts and their embedded terms are rarely, if ever, created from scratch.\textsuperscript{44} Both law firms and individual lawyers often store documents from prior transactions and subsequently reuse developed contract provisions as a perceived procedural best practice.\textsuperscript{45} Such standardization has “a long tradition in transactional legal practice” and provides a range of benefits, including efficiency, cost reduction, simplified negotiations with opposing parties, and a lower risk of undesirable judicial interpretation.\textsuperscript{46} Standardization is often supported by a similar transactional technique known as contract modularity. Modularity refers to the ability of components within a system to be separated or combined without compromising the completeness of the rest of the system.\textsuperscript{47} In other words, contracts are “modular to the degree that their parts can be drafted and read without adjustment or reference to other parts of

\begin{itemize}
\item \textsuperscript{39} Id. at 192.
\item \textsuperscript{40} Id. at 195.
\item \textsuperscript{41} Id.
\item \textsuperscript{42} Id. at 186.
\item \textsuperscript{43} Id. at 184; see also Goetz & Scott, supra note 6, at 286–92.
\item \textsuperscript{44} Triantis, supra note 3, at 186.
\item \textsuperscript{45} Id.
\item \textsuperscript{46} Id.
\item \textsuperscript{47} A classic study of modularity is 1 CARLESS Y. BALDWIN & KIM B. CLARK, DESIGN RULES: THE POWER OF MODULARITY 63 (2000) (defining modularity). The modularity of contracts has been observed by several scholars. E.g., Lawrence A. Cunningham, Language, Deals, and Standards: The Future of XML Contracts, 84 WASH. U. L. REV. 313, 324 (2006); Margaret Jane Radin, Boilerplate Today: The Rise of Modularity and the Waning of Consent, 104 MICH. L. REV. 1223, 1224 (2006) (“Boilerplate can be used not just for standardization but, because terms can be used as building blocks, for customization.”); Henry E. Smith, Modularity in Contracts: Boilerplate and Information Flow, 104 MICH. L. REV. 1175, 1180 (2006) (“[A]djustment can happen within modules without causing major ripple effects”).
\end{itemize}
the contract.” 48 Modularity often reduces transactional costs because it allows a firm to divide contracts into individual components and allocate those components to various attorneys—many of whom are junior associates with lower billing rates—which facilitates independent and simultaneous drafting of components that will ultimately be combined into one final contract. 49 Junior associates, for example, will often complete the majority of the initial legal drafting, with more senior attorneys providing guidance and supervision along the way. 50

Standardization and modularity offer a number of benefits, such as the ability to reduce overall costs through knowledge sharing. 51 Effective standardization fundamentally relies on a law firm’s redeployment of contract terms across its transactions as well as the sharing of those terms with other firms. 52 In doing so, the standard contract term gains widespread adoption, which benefits all parties in the industry utilizing the term. While the firm drafting the term captures economies of scale 53 by applying it to multiple transactions, the non-drafting party benefits in that a standard term is easier to read and understand. This allows the non-drafting party to more quickly process the familiar term, which reduces reading costs and simplifies negotiations over contract language to the benefit of both parties. 54 The tradition of knowledge sharing within and across law firms advances this mutually beneficial

49. Id. at 202. “Developing even a simple form requires several hours of attorney time at multiple levels of the organization (i.e., junior associate level, partner level, and practice group leader level).” Patrick Dundas, Legal Document Drafting – Tools and Practices That Enhance a Firm’s Competitive Edge, in LAW FIRM KM: DRIVING PRACTICE INNOVATION AND REDEFINING SERVICE DELIVERY 39, 54 (Laura Slater ed., 2016).
51. Triantis, supra note 3, at 187.
52. Id.
53. “An economy of scale is achieved when increasing the scale of production decreases long-term average costs. In other words, the cost of production per unit decreases as a company produces more units. Reducing the cost per unit of production is the most significant advantage created by economies of scale.” Prateek Agarwal, Economies of Scale, INTELLIGENT ECONOMIST, https://www.intelligenteconomist.com/economies-of-scale/ (last updated Apr. 11, 2019).
54. Triantis, supra note 3, at 186.
process, enabling significant time and cost savings at all three stages of the contracting process. Accordingly, firms are strongly incentivized to focus on cutting costs through standardized or customized transactional products rather than creating more innovation provisions.

Another benefit of standardized contract terms is the intrinsic value that accompanies more predictable judicial interpretation. Standard terms, with their widespread usage, are more likely to have been interpreted by a court and enforced by precedent. Increased certainty regarding a term’s interpretation allows lawyers to better avoid and/or predict the likely outcomes of potential disputes. Such insights also create more efficient legal drafting, which reduces costs on the front-end stage. Standard terms reduce the need for and cost of interpretation of a provision in court and guard against judicial error since existing precedent is available to advise informal interpretation. Greater certainty of enforcement and familiarity of standard provisions also facilitates the assignability or liquidity of contracts.

Lawyers also collaborate across firms to produce contracts through organizations like the American Bar Foundation and the American Bar Association. E.g., Comm. on Tr. Indentures and Indenture Trs., ABA Section of Bus. Law, Model Negotiated Covenants and Related Definitions, 61 BUS. LAW. 1439 (2006); Ad Hoc Comm. for Revision of the 1983 Model Simplified Indenture, et al., Am. Bar Ass’n, Revised Model Simplified Indenture, 55 BUS. L. 1115 (2000). Some regulatory requirements also mandate disclosure of contract forms—under securities law, for example, Regulation S-K mandates the periodic disclosure of material contracts. 17 C.F.R § 229.601(b)(10) (2014).

Triantis, supra note 3, at 209; see also Marcel Kahan & Michael Klausner, Path Dependence in Corporate Contracting: Increasing Returns, Herd Behavior and Cognitive Biases, 74 WASH. U. L. REV. 347, 349 (1996) ("If one looks more closely at actual standard terms, . . . one finds disturbing instances of apparent suboptimality: standard terms that do not work in a reasonable manner; and uniformity in terms where one would expect more diversity to be optimal.").

Triantis, supra note 3, at 181.

Id. at 186.

Id.

Id. at 194; see also JOHN MAYNARD KEYNES, THE GENERAL THEORY OF EMPLOYMENT, INTEREST AND MONEY 158 (1936) ("Worldly wisdom teaches that it is better for reputation to fail conventionally than to succeed unconventionally."). A “herding bias” may exist among lawyers due to risk aversion and the way a legal reputation is drawn primarily from outcomes—that is, whether or not a term gives rise to litigation or an unfavorable interpretation. Kahan & Klausner, supra note 56, at 355–58.

Triantis, supra note 3, at 194–95.

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assigned or traded” to non-drafting third-parties. Thus, drafting parties who depart from standardized terms to include unfamiliar contract terms not only lose the benefits of network and learning externalities, but also discount the secondary market value of their contracts.

While standardization offers many benefits, primarily in the form of reliability and cost savings, it can stifle incentive among lawyers to develop and adopt novel contract terms. When adopted by the industry at large, standardized contract terms effectively “lock in market standards,” which create a form of path dependency. Path dependency theory suggests that the continued use of a certain practice occurs simply because “it is often easier or more cost-effective to continue along an already set path than to create an entirely new one.” Thus, a form of professional social pressure exists, from both clients and law firm partners, to use and conform to traditional terms and practices. Any lawyer who creates or adopts novel contract terms is likely to face industry resistance, as such terms require other professionals to exhaust more resources than would otherwise be necessary to interpret them. Innovators also risk unanticipated judicial interpretations. For these reasons, standardization of contract terms conflicts with innovation and furthers the industry’s already natural bias toward the status quo.

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62. Id. at 195; cf. Marc Oliver Bettzüge & Thorsten Hens, An Evolutionary Approach to Financial Innovation, 68 REV. ECON. STUD. 493, 505 (2001) (discussing how a particularly important feature of financial innovation is whether it can be standardized and traded in a liquid market—standardized and modular legal contracts are an example of a liquid asset).
63. Triantis, supra note 3, at 194; Wickelgren, supra note 13.
64. Triantis, supra note 3, at 209.
65. Id. at 192.
68. Triantis, supra note 3, at 194; see also Choi & Gulati, supra note 67, at 1167 (proposing that judges interpret contracts as statutes and consider the intent of the first adopters of a boilerplate provision).
69. Triantis, supra note 3, at 182; Korobkin, supra note 13 (discussing research findings in which study participants favored a familiar contract term to a new one).
D. Limited Intellectual Property Protection

Another obstacle to innovation is the limited intellectual property protection available to drafters for novel contract language. Fundamentally, no one can gain a monopoly over elementary legal words and phrases that exist in the public domain.\(^70\) Similarly, legal forms that borrow standard language do not qualify for copyright protection\(^71\) simply because of minor changes in syntax or the addition of a few words. Although word arrangements have likely been altered, they are, at best, merely a paraphrasing of earlier forms and there is nothing recognizably different from the language used before.\(^72\) Specific language of a contract, however, may be protected by the author’s copyright, but only if it is specific and original.\(^73\) Thus, “[e]ven specific, original language might lose its copyright if it is judicially interpreted and becomes part of the common law.”\(^74\) “Other expressions of the same idea[,]” however, are not protected under copyright law.\(^75\) Therefore, those wishing to avoid copyright infringement can easily replicate innovative contract provisions by simply avoiding the specific language used by the original drafter.\(^76\) “Improvements in contract language are also difficult to protect as trade secrets because at least one other party—the contracting partner—has access to the language, and some material contracts must be

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72. Triantis, supra note 3, at 195.

73. Id.; see also 1–2 Melville B. Nimmer & David Nimmer, Nimmer on Copyright § 2.18.


75. Triantis, supra note 3, at 195.

76. See id.
publicly disclosed as a matter of law.”77 A debate also persists regarding whether contract terms can be patented.78

Without intellectual property protection, contract innovators are unlikely to obtain any meaningful return (financial or otherwise) when deploying a term or provision in a third-party transaction.79 If developed at all, such terms “typically emerge at the [[premium end]” of the legal market and thereafter evolve to commoditized services.80 Under the current system, an upmarket lawyer or firm that develops novel terms cannot effectively isolate and realize a financial return on those terms despite taking on significant market risk, even if the term becomes widely adopted.81 If one party to a transaction, for example, assumes the cost of developing an innovative contract provision, the non-drafting party would likewise receive the benefit of such without incurring an equivalent cost.82 Even entities who are not parties within the exchange can adopt the term since many material contracts are necessarily disclosed to the public. And since the most a firm developing a new term can hope for is an arguable reputational bump among clients and other firms, little incentive exists for it to innovate, unless a client is willing to a pay a premium for highly customized and unique work. Consequently, parties often invest as little as possible into contract production, which perpetuates the use of inefficient and increasingly archaic terms.83

E. Market Resistance to Adopting Novel Terms

In addition, novel contract terms rarely survive unless the innovator can effectively reduce the time lapse between a term’s creation and its adoption by the industry as a new standard. Those hoping for widespread adoption must develop and leverage broad channels to disperse the term immediately upon creation.84 Triantis

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77. Id. at 196 (footnotes omitted); see also 17 C.F.R. § 229.601 (2019).
80. Id. at 185. See generally MAISTER, supra note 26.
81. Triantis, supra note 3, at 181.
82. Id. at 197.
83. Id.
84. Id. at 195.
offers the creation and deployment of the “poison pill” by Wachtell, Lipton, Rosen & Katz—a prominent New York law firm—as an example of an effective channel strategy. To effectively proliferate the provision, Wachtell undertook an aggressive promotional campaign to convince a broad range of corporate managers—many of whom were not previously clients of the firm—to incorporate the poison pill into their contracts. The law firm simultaneously reduced client skepticism of the provision by absorbing all of the back-end stage risk of the term and taking steps to ensure it would not be struck down by the courts. This approach enabled the firm to effectively realize a financial return on the term since its development of the poison pill generated additional revenue from new clients. This example, however, is difficult for other law firms to imitate since the organizational structure of Wachtell is uniquely positioned toward innovation rather than standardization.

F. Structural Features of Legal Entities

Structural features that exist within law firms, government, and industry associations serve as another barrier to contract innovation. Traditional law firm practices, like hourly fee billing and billable hour compensation, for example, emphasize efficient

86. Triantis, supra note 3, at 199–200; see also “Marketing” at Wachtell, Lipton, Rosen & Katz, HARV. BUS. SCH. Case Study 9-496-037 (1995), Once Wachtell had successfully defended the poison pill in the Delaware courts, the term became quite standard in the industry. Id.
87. Triantis, supra note 3, at 200.
89. Triantis, supra note 3, at 202.
client service rather than innovation. Such emphasis prevents firms from investing in the very research and development that could lead to discovering and developing innovative transactional terms. Law firms that attempt to pursue both standardization and innovation are still unlikely to overcome impediments to innovation, since a “blurred business strategy” often threatens every other feature of a firm, including governance, compensation, and promotion. Organizational biases within firms may also act as an impediment to innovation. While law firms frequently succeed in hiring professionals with diverse legal skills, they often fall victim to the tendency of hiring individuals with profiles similar to those of current employees (e.g., partners hiring students from their alma maters). Hierarchy and collegiality within firms can also discourage individual lawyers from altering precedent forms of legal terms. In many cases, this is true of junior associates trying to avoid offending a partner who authored the provision in question. These collective realities combine to make law firms a relatively hostile environment for innovation.

Government, often through the court system and legislature, is an alternative source of innovation through default rules designed


91. See Triantis, supra note 3, at 186.

92. Id. at 202. See generally MAISTER, supra note 26.

93. Triantis, supra note 3, at 199.

94. Id.


Law firms have been slow to respond [with innovation] to changing market conditions for a variety of reasons, including: (1) an initial hope that the post-recession marketplace would ‘return to normalcy’—it hasn’t and won’t; (2) their economic models are inimical to it; (3) an inability to raise investment capital due to regulatory constraints (an irony since lawyers are self-regulated); (4) lack of expertise in tech and process driven legal delivery and the unwillingness to accord it equal status with legal acumen; (5) the partnership model that ‘whacks up profits’ rather than re-investing them (‘short-termism’); and (6) passivity of buyers emanating from lawyers selling to other lawyers (that’s changing). Firms have made changes, but largely internal ones that sustain profit-per-partner (PPP), the holy grail of their metrics.

Id.
to serve a broader social interest, as compared to that of private law firms.\footnote{Triantis, supra note 3, at 198–99.} Such government entities, however, often lack the resources to design efficient default provisions, other than in circumstances where a simple rule is available that fits a wide range of contexts.\footnote{\textit{See} Alan Schwartz & Robert E. Scott, \textit{Contract Theory and the Limits of Contract Law}, 113 YALE L.J. 541, 598–601 (2003).} As a result, default provisions are often created through the collaborative effort of legal practitioners, academics, and non-legal industry experts.\footnote{Triantis, supra note 3, at 197–99.} This “public production of default terms,” however, has come under considerable criticism from academics.\footnote{\textit{Id.} at 198.} In addition, government regulators and legislators may also be influenced by dominant interest groups or pursue self-serving personal agendas, both of which may distort any incentive to innovate.\footnote{\textit{Id.} at 198–99.}

In conclusion, Triantis suggests that law firms can more effectively respond to industry pressures and emerging technologies—while simultaneously overcoming the many impediments to contract innovation—by leveraging principles of modularity that improve the quality of their transactional services.\footnote{\textit{Id.} at 191–92.} This theory, however, fails to fully consider whether alternative methods exist for incentivizing contract innovation outside traditional law firms.

\section*{IV. Distributed Ledger Technology and Smart Contracts}

Despite the barriers outlined by Triantis that prevent development of innovative contract terms, technologies external to law firms are significantly impacting the cost and quality of developing transactional agreements.\footnote{\textit{Id.}} One such technology is that of smart contracts built upon a so-called distributed ledger. While distributed ledger technology and smart contracts are

\begin{itemize}
\item \footnote{Triantis, supra note 3, at 198–99.}
\item \footnote{Triantis, supra note 3, at 197–99.}
\item \footnote{\textit{Id.} at 198.}
\item \footnote{\textit{Id.} at 198–99.}
\item \footnote{\textit{Id.} at 191–92.}
\item \footnote{\textit{Id.}}
\end{itemize}

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“symbiotically linked” and often referenced synonymously, they are actually two distinct technologies.\textsuperscript{103}

\textit{A. Distributed Ledger Technology}

At a fundamental level, DLT is a term broadly used to describe any method of maintaining a distributed ledger on a network of computers.\textsuperscript{104} While often used interchangeably with DLT, the term “blockchain” is actually a sub-set of the broader technology.\textsuperscript{105} Confusion around this distinction stems from the fact that the most common forms of DLT utilize the “blockchain approach,” which employs a chain of “blocks” to successfully provide secure and valid means of achieving a distributed consensus.\textsuperscript{106} Thus, a blockchain is only one type of data structure considered to be a distributed ledger.\textsuperscript{107}

A distributed ledger is a decentralized “digital record that is shared instantaneously across a network of participants”\textsuperscript{108} which aims to “establish[] consensus without the need for a centralized repository of information.”\textsuperscript{109} The ledger is distributed in that each participant (or node) in the network holds a copy of the master ledger.\textsuperscript{110} Whenever participants make changes to their respective copies, the network is notified and must agree at regular intervals which changes will be permanently reflected in the master ledger.\textsuperscript{111} Consensus techniques ensure that all network participants agree with the changes, which prevents the existence of multiple competing versions of the ledger.\textsuperscript{112} Thus, the ledger is decentralized, meaning there is no single administrative center for


\textsuperscript{104} \textit{Id.} at 7.

\textsuperscript{105} \textit{Id.}

\textsuperscript{106} \textit{Id.} at 7, 7 n.10.

\textsuperscript{107} \textit{Id.} at 7.

\textsuperscript{108} \textit{Id.} at 7.

\textsuperscript{109} Max Raskin, \textit{The Law and Legality of Smart Contracts}, 1 GEO. L. TECH. REV. 305, 318 (2017).

\textsuperscript{110} ISDA & Linklaters, \textit{supra} note 103, at 7.


\textsuperscript{112} ISDA & Linklaters, \textit{supra} note 103, at 7.
the network. Influence and ownership are shared equally between network participants. Simply put, a distributed ledger can be thought of as “an army of robots checking up on each others’ work” to achieve an optimal ledger for the network. The network effect of this technology facilitates the transfer of value between parties without a traditional and trusted third-party intermediary (e.g., banks).

![Figure 1.0: Transaction Verification Through Distributed Ledger Technology. Derived from CBInsights.](image)


In order to move anything of value over any kind of blockchain, the network [of nodes] must first agree that that transaction is valid, which means no single entity can go in and say one way or the other whether or not a transaction happened.

To hack it, you wouldn’t just have to hack one system like in a bank . . . you’d have to hack every single computer on that network, which is fighting against you doing that.

Id.

114. *Id.*; see infra Figure 1.0.


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Notably, distributed ledgers have the capacity to be either public or private.\textsuperscript{118} Many popular distributed ledgers (e.g., the blockchain supporting Bitcoin) are considered public or permissionless, which means anyone from the public domain can see its data and participate in the network.\textsuperscript{119} In the true spirit of DLT, no participant within the public network has “superadministrator-type rights.”\textsuperscript{120} However, most work in the financial and professional services industries that leverage the technology is conducted on private or permissioned networks.\textsuperscript{121} Participation in these networks is, of course, limited to relevant contributors, regulators, and parties to the transactions.\textsuperscript{122} While copies of the ledger are still distributed within the network, private ledgers introduce a degree of centralization by granting “some override or super-administrator-type rights” to a single entity or group of entities over how the distributed ledger operates.\textsuperscript{123} The privatization of distributed ledgers is essential to draw commercial parties to the technology considering the confidential and sensitive nature of their information and data.\textsuperscript{124}

\textbf{B. Smart Contracts}

With a distributed ledger serving as the platform upon which smart contracts are hosted and executed, a smart contract can be thought of as an automated and self-executed (and therefore self-enforced) agreement dictated by a predetermined set of conditional actions.\textsuperscript{125} Like the technology upon which it is built, smart contracts are designed to enable parties to conduct transactions without the need for a middleman.\textsuperscript{126} The term “smart contract” was introduced by Nick Szabo in 1996 when he described it as “a set of promises, specified in digital form, including protocols

\begin{itemize}
\item \textsuperscript{118} ISDA & Linklaters, \textit{supra} note 103.
\item \textsuperscript{119} \textit{Id.}
\item \textsuperscript{120} \textit{Id.}
\item \textsuperscript{121} \textit{Id.}
\item \textsuperscript{122} \textit{Id.}
\item \textsuperscript{123} \textit{Id.}
\item \textsuperscript{124} \textit{Id.}
\item \textsuperscript{125} Raskin, \textit{supra} note 109, at 306, 306 n.1.
\item \textsuperscript{126} Sing. Mgmt. Inst., \textit{supra} note 116, at 6.
\end{itemize}
within which the parties perform on these promises.” 127 Szabo analogizes the self-executing nature of smart contracts with the operation of a common vending machine. 128 Vending machines are designed to automatically dispense selected products when customers insert the amount of money required to purchase the product. 129 Upon “unilateral acceptance” by the customer in the form of inserted money, these machines complete their side of the contract automatically. 130 This example captures the essence of what a smart contract is and does.

Since Szabo’s introduction of the term, however, the technology surrounding smart contracts has evolved considerably. As a result, there are now many competing definitions for a smart contract. 131 Technologists, for example, think of smart contracts more as the computer code that enables the contract. 132 Whereas attorneys think of smart contracts more as the obligations assumed by each party to the smart contract. 133 In an opinion piece, attorney Joshua Stark articulates two competing definitions for a smart contract, which could more accurately be thought of as complementary components within a smart contract: (1) “smart contract code”—computer code that is stored on the distributed ledger and “designed to self-execute certain tasks if pre-defined conditions are met”; and (2) “smart legal contracts”—digital contracts (designed either to complement or entirely substitute natural language agreements) with the potential of “creating legally enforceable rights” that are executed by software embedded with smart contract code. 134 In other words, a smart legal contract always contains at least one piece of smart contract code, but not all pieces of smart contract code equate to a smart legal contract. 135 Smart

128. Id. at 3.
129. Raskin, supra note 109, at 306, 314.
130. Id. at 314.
131. ISDA & Linklaters, supra note 103, at 4.
132. Id.
133. Id.
134. Id. at 5; see also Josh Stark, Making Sense of Blockchain Smart Contracts, COINDESK (June 4, 2016), https://www.coindesk.com/making-sense-smart-contracts.
135. ISDA & Linklaters, supra note 103, at 5.
legal contracts mimic the structure of natural language agreements since they rely largely upon modular-coded units.\textsuperscript{136}

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{figure2.png}
\caption{Comparison of Contract Modularity}
\end{figure}

Distinguishing these two components helps avoid confusion but unfortunately provides no universal definition of a smart contract.\textsuperscript{137} One definition that does appear broad enough to capture both components was presented by Clack, Bakshi, and Braine: “A smart contract is an automatable and enforceable agreement. Automatable by computer, although some parts may require human input and control. Enforceable either by legal enforcement of rights and obligations or via tamper-proof execution of computer code.”\textsuperscript{138}

\textbf{C. Benefits of Smart Contracts}

Given their broad application, smart contracts offer several advantages over traditional natural language agreements. Some proponents focus primarily on the ability to reduce transaction costs.\textsuperscript{139} Others emphasize the potential for increased efficiency among parties to the transactions and the lawyers who assist

\begin{footnotesize}
\begin{you双重checknum}{136}{See Figure 2.0.}
\begin{you双重checknum}{137}{ISDA & Linklaters, \textit{supra} note 103, at 5.}
\begin{you双重checknum}{138}{\textit{Id.}}
\begin{you双重checknum}{139}{Raskin, \textit{supra} note 109, at 309.}
\end{footnotesize}
them.140 Perhaps the most compelling benefit of the technology, however, are the promises of reduced contract ambiguity and more certain outcomes. Though similar to the vending machine example outlined in section IV.B, smart contracts are significantly more powerful. A smart contract, for example, can support the execution of multiple transactions at any given moment, whereas a vending machine is only capable of supporting a single transaction.141 The technology also has the potential to prevent the hassle and expense of contract breaches, which effectively eliminates the need for third-party enforcement.142

Either party to a natural language agreement may voluntarily breach at any time. Parties to a smart contract, however, are prevented from such voluntary breach since their transaction is designed to self-execute upon the occurrence of a designated event.143 Thus, the self-executing nature of a smart contract effectively eliminates the need for a third-party enforcer since no breach is ever allowed to occur in the first place.144 Additionally, there is also far less potential for ambiguity in computer programming code—which is the basis for smart contracts—than there is in words that comprise natural language agreements.145 These and other benefits associated with smart contracts suggest that adopting the technology may be one solution for law firms seeking to conform to the pressures facing the legal industry.

D. Drawbacks of Smart Contracts

Despite these apparent benefits, however, smart contracts are not a perfect solution and come with their own set of limitations

140. See id. at 319; James Bellamy & Chris Hill, Can the Blockchain Make Our Contracts Smarter?, 21 No. 11 CYBERSPACE L. NL 2 (2016).
141. ISDA & Linklaters, supra note 103, at 6.
142. Michael Bacina, Smart Contracts and Contract Disputes, MEDIUM (Nov. 22, 2018), https://medium.com/@MikeBacina/smart-contracts-and-contract-disputes-4f277ae0b356. “Blockchain… instantly reduces the workload needed for a party to prepare[] for enforcement of a breach of contract, and may lead to many disputes never reaching the lawyers in the case of self enforcing smart contracts or records which can’t be disputed.” Id.
143. Raskin, supra note 109, at 309; ISDA & Linklater, supra note 103, at 9.
144. ISDA & Linklater, supra note 103, at 9.
145. Raskin, supra note 109, at 324. There is less ambiguity in computer code since it is “more robotic than human interpretation, given its reliance on specified rules that limit term recognition.” Id. at 324, 326.
and drawbacks. Contrary to common perception, smart legal contracts (with their embedded smart contract code) rarely exist independent of natural language agreements. This is largely because smart contract code is often an inadequate or ineffective way to convey complex legal language. So the vast majority of commercial agreements continue to be comprised of boilerplate terms and clauses designed to guard against liability. As a result, smart legal contracts are unlikely to ever fully replace natural language agreements, as they are not ideally suited for every business transaction. Natural language agreements, more likely than not, will continue to exist and evolve as a combination of both natural legal language and computer code.

For example, Stark provides a use case of how a supplier and distributor could enter into a contract for goods and capture the payment terms in smart contract code designed to automatically execute upon delivery of those goods. While the delivery of goods and amount due are straightforward enough terms to be captured in smart contract code, other terms may be too ambiguous. If the distributor, for instance, desired compensation

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148. Stark, supra note 134; see also Mik, supra note 147. At present, the input parameters and the execution steps for a smart contract need to be specific and objective. In other words, if ‘x’ occurs, then execute step ‘y.’ Therefore, the actual tasks that smart contracts are performing are fairly rudimentary. . . . Smart contracts are presently best suited to execute automatically two types of ‘transactions’ found in many contracts: (1) ensuring the payment of funds upon certain triggering events and (2) imposing financial penalties if certain objective conditions are not satisfied. In each case, human intervention, including through a trusted escrow holder or even the judicial system, is not required once the smart contract has been deployed and is operational, thereby reducing the execution and enforcement costs of the contracting process.


149. Stark, supra note 134.

150. Bellamy & Hill, supra note 140.

151. Stark, supra note 134.

152. Id.
from the supplier for any defective products received, a natural language agreement would likely be required since identifying defective goods requires human judgment that goes beyond the simplistic nature of computer code.\textsuperscript{153} Despite the difference in form, these two contracting techniques—smart contract code and natural language agreements—may effectively coexist as part of a blended legal contract.\textsuperscript{154}

\textbf{Figure 3.0: Blended Legal Contract}

Significant issues also surround the efficacy and implementation of smart legal contracts.\textsuperscript{155} Fundamental contract law, for example, still requires that an offer be “clearly and unambiguously accepted,” even if a smart legal contract is technically capable of self-executing.\textsuperscript{156} Thus, attorneys utilizing smart legal contracts must ensure parties satisfy all requirements needed to form a valid contract.\textsuperscript{157} Similarly, smart legal contracts pose the challenge of how to effectively resolve desired modifications to the agreement.\textsuperscript{158} The execution of an intended

\textsuperscript{153} Id.
\textsuperscript{154} Id.; see infra Figure 3.0.
\textsuperscript{155} Bellamy & Hill, supra note 140.
\textsuperscript{156} Id.
\textsuperscript{157} Id.
\textsuperscript{158} Raskin, supra note 109, at 326.
smart legal contract depends entirely upon the accuracy of the smart contract code embedded within it.\textsuperscript{159} Rectifying errors in such a contract may prove challenging, especially if such errors are discovered after the contract has already self-executed.\textsuperscript{160} Smart legal contracts may also require at least some level of “active monitoring” to ensure both parties fulfill their legal obligations.\textsuperscript{161} Another issue associated with smart legal contracts is that of information confidentiality and security for both public and private distributed ledgers.\textsuperscript{162} The public nature of traditional distributed ledgers may discourage commercial adaptation of the platform entirely, unless a private ledger is utilized with stricter controls over user access.\textsuperscript{163} Yet, even private distributed ledgers operated by third-parties should be carefully evaluated to ensure the existence of proper confidentiality provisions.\textsuperscript{164} Even with these precautions, entities leveraging the technology may still be subject to large-scale data and information breaches, which often occur unexpectedly and even among some of the most robust and well-designed platforms.\textsuperscript{165} This is especially true of private distributed ledgers since they forgo a primary benefit of the technology—that is, an open-source platform that allows and encourages experts to inspect and resolve flaws and vulnerabilities in the computer code.\textsuperscript{166}

Despite these apparent drawbacks, economists still view smart contracts and DLT as “a general-purpose technology,” which means their implementation will likely still result in a variety of applications that affect nearly every industry vertical.\textsuperscript{167} While the technology has endless applications, the most germane use cases

\begin{footnotesize}
\begin{enumerate}
\item Bellamy & Hill, supra note 140.
\item Id.
\item Id.
\item Id.
\item Id.
\item Bellamy & Hill, supra note 140.
\item Church, supra note 111.
\end{enumerate}
\end{footnotesize}
appear to be those that involve “straightforward clauses” with “clearly defined outcomes.” For these types of contractual arrangements, smart contracts and DLT have the capacity to effectively replace much of the routine work currently conducted by transactional lawyers across the three stages of contracting.

Though greater efficiencies and reduced costs make the technology attractive to legal professionals, understandable skepticism continues to impede its widespread adoption by the industry. The still early and untested nature of smart contracts and DLT continues to drive most transactional lawyers—who are primarily responsible for facilitating secure and predictable transfers of value—to continue their reliance upon paper-based natural language agreements. In addition, the same barriers that impede innovation in the drafting of natural language agreements also deter lawyers from innovating through smart contracts and DLT. These barriers include standardization of contract terms, limited intellectual property protection, market resistance to adopting novel terms, and structural features of legal entities. Thus, a total and immediate shift toward the technology remains unlikely. These realities coupled with the other obstacles identified by Triantis will likely impede contract innovation in the traditional law firm model.

V. CAPTURING GREATER RETURNS, PLATFORM DOMINANCE & BLOCKCHAIN LOCK-IN

While the legal profession appears hesitant to completely integrate smart contracts and DLT, commercial entities are actively seeking the benefits of their adoption and implementation. Many of these entities have created DLT systems that allow others to capture operational value by uploading their data, which can subsequently be analyzed and leveraged to develop efficient business transactions through smart contracts. Such systems have


the potential to serve as “an entirely different platform”—outside of the traditional legal model—for parties to create and enforce agreements. Such alternative contracting platforms could effectively reduce and/or eliminate a client’s need for a transactional lawyer in the drafting of traditional natural language agreements. As a result, large commercial entities are likely in the strongest position to capture financial returns from contract innovation and the development of such platforms since their business models inherently insulate such returns from competitors. Thus, commercial entities utilizing DLT and smart contracts may be more effective engines of innovation than law firms that simply leverage tools of modularity.

Traditional law firms, as noted above, often struggle to capture returns from novel contract provisions because the value of textual legal language is instantly shared with both parties to the contract and sometimes with the public at large. In contrast, contract innovations developed by a commercial entity with a DLT platform often take a different form than mere textual language. Since these platforms utilize smart contract technology, innovation to their contracts usually occurs through smart contract code. Using a customer’s data, for example, an entity could create a series of smart legal contracts that automate various transactions within a customer’s supply chain. Over time, that entity would likely develop more efficient ways to manage the customer’s supply chain, which would result in the creation of an increasingly robust mega-contract—that is, a series of interconnected smart legal contracts—for the customer. Unlike textual legal language, such innovation is not immediately accessible by competitors since no single contracting party to the transaction has visibility of the smart contract code for the customer’s entire mega-contract. Rather, a contracting party to a smart legal contract would only have visibility into the smart contract code of the individual transaction to which they are a party. The contracting party would not, however, have access to the customer’s other interconnected smart

171. Triantis, supra note 3, at 196.
172. Id. at 197.
legal contracts, which interconnectivity is ultimately the innovation that commercial entities are offering. Therefore, even without intellectual property rights, commercial entities are better positioned to protect such innovation from competition.

Commercial entities also benefit directly from developing such robust contracts over time for individual customers. Customers that capture efficiencies and cost savings through the technology are more likely to increase their usage. As a customer increases the amount of data managed on an entity’s DLT platform, they naturally become more dependent upon that entity. Such dependency drives customer loyalty and lock-in to the entity’s blockchain. By that point, the cost and time required to subsequently switch an entire contracted supply chain to another provider is so exorbitant that such a transition is simply unreasonable.

Perhaps even more valuable than the lock-in of individual customers is an entity’s ability to leverage and apply learnings from previously developed smart contracts. When an entity develops an innovative smart contract for one customer, the computer code belongs to the entity. As a result, the entity can immediately reuse the existing code as a model for other customers with similar transactional needs. This strategy mimics the use of standardized contract terms deployed by traditional law firms. Just as legal professionals store documents and terms from prior transactions for future use, commercial entities with DLT platforms effectively do the same with the smart contracts they develop. Such standardization benefits the commercial entity by establishing procedural best practices that capture efficiencies and reduce cost.

Standardization deployed by commercial entities is further supported by another strategy from the legal profession: contract modularity. Like the text within a natural language agreement, smart contract code is capable of being independently created and subsequently separated or combined without compromising the completeness of the entire smart legal contract. Such modularity further reduces costs for the commercial entity because it allows a team of programmers to divide and allocate components of the
smart contract code, which facilitates independent and simultaneous creation that can ultimately be combined.\textsuperscript{173}

Though similarities certainly exist between the deployment of standardized legal language and standardized smart contract code, there is a key difference worth noting. An important benefit of standardized legal language is the intrinsic value of predictable judicial interpretation. To be achieved, however, this benefit requires widespread use of a standardized provision among legal professionals in the industry. Such broad usage increases the likelihood that a court will have interpreted the provision and that the interpretation will be reinforced by precedent. Consequently, legal professionals that abandon standardized provisions take on unnecessary risk, while simultaneously losing network benefits.\textsuperscript{174} Smart legal contracts, on the other hand, are designed to be self-executing and self-enforcing. Since these contracts make it more difficult to breach the agreement, there is often less need for judicial interpretation and therefore less incentive among commercial entities to standardize innovations for predictable interpretation. This important difference reinforces both the ability of commercial entities to insulate contract innovation and their incentives to do so.

\textbf{VI. CASE STUDY: IBM}

International Business Machines Corporation’s (IBM) application of DLT illustrates how this alternative approach to incentivizing contract innovation may better position commercial entities, rather than law firms, to protect innovation from competitors. As a global technology company with a broad range of cloud-based solutions and business consulting services, IBM maintains a diverse portfolio of products and services, including cloud computing, cognitive computing, commerce, data and analytics, Internet of Things (IoT), IT infrastructure, mobile, and security.\textsuperscript{175} More specifically, IBM is attempting to unlock the potential of DLT by making the technology more accessible to its

\textsuperscript{173} \textit{Id.} at 191.
\textsuperscript{174} \textit{Id.} at 194–95.
business clients through its Watson Platform and Blockchain.\footnote{176} While perhaps the most notable usage scenarios of DLT involve the financial sector, the technology has broad application to IoT solutions, which IBM is attempting to leverage.\footnote{177}

A. IBM Watson IoT Platform

Launched in 2011, the IBM Watson Platform is an artificial intelligence program that uses natural language processing and machine learning to mine and classify insights from large amounts of unstructured data in a short period of time.\footnote{178} A subset of this technology is the Watson IoT Platform, which unites artificial intelligence with IoT to improve efficiency and productivity for IBM’s business clients.\footnote{179} Broadly speaking, IoT allows a variety of objects to be sensed or controlled remotely across an existing network infrastructure.\footnote{180} This network creates opportunities for more direct integration of the physical world into computer-based systems, which drives improved efficiency, accuracy, and economic benefit through reduced human intervention.\footnote{181} Despite its relatively new presence in the market, Watson IoT has already developed a strong customer base.\footnote{182} Currently, IBM incentivizes customers to join its platform by offering free and open access to Watson IoT and its accompanying development capabilities.\footnote{183}

\begin{footnotes}
\item[176] See generally MANAV GUPTA, BLOCKCHAIN FOR DUMMIES: IBM LIMITED EDITION (2017).
\item[178] Watson (Computer), supra note 175.
\item[181] Internet of Things, supra note 180.
\item[182] Kaul, supra note 179. Watson IoT customers include: airlines, car manufacturers, telecom companies, etc. Id.
\end{footnotes}
IBM’s objective is that customers—once they begin realizing benefits from the technology—will add additional data to the platform and eventually become a paying customer willing to expand their free prototypes into larger scale production.184

B. IBM Blockchain

Watson IoT recently integrated with the IBM Blockchain, which serves as the company’s DLT platform that facilitates transactions between parties.185 This integration allows the connected IoT devices of business clients to interact with one another and send any relevant interactions or collected data to private distributed ledgers within the IBM network.186 Data gathered from those devices can be monitored and analyzed for business intelligence, then utilized to create smart contracts.187 Smart contracts update and validate the data sent to the distributed ledger and subsequently deliver it to all interested participants in the business network.188 All business partners have a record of each transaction, effectively preventing disputes and ensuring each partner is held accountable for their individual roles in the overall transaction. Such decentralized integration effectively reduces the need for human monitoring and improves the security of IoT solutions by implementing specific consensus mechanisms that guard against compromised devices.189

C. IBM Integration of Watson IoT & Blockchain

By integrating Watson IoT with IBM Blockchain, the company attempts to lock-in customers to its broader business ecosystem to capture value.190 Initially free of charge, potential customers link IoT devices and data to Watson IoT to manage their information. These entities often become paying customers once they realize the added benefits of incorporating their data with the rest of the IBM

184. Id.
185. Kaul, supra note 179.
186. Id.
187. Gantait et al., supra note 177.
188. Id.
189. Id.
190. See infra Figure 4.0.
platform (e.g., increased accuracy and efficiency through a more transparent shipping process). When a customer makes this transition, IBM effectively reconfigures the customer’s supply chain through its Blockchain. In other words, the integrated technologies enable IBM employees to design contractual relationships for customers using smart contract code—which has the potential to drastically reduce a customer’s need for natural language agreements through lawyers. Customers, in turn, achieve inexpensive ongoing management and execution of highly specific and mundane transaction obligations.

IBM creates value for customers by providing contract maintenance and improvement, and captures financial returns for these efforts through an ongoing management fee. These innovative contract improvements—achieved primarily through more efficient or effective smart contract code—are insulated from competitors, which makes IBM the exclusive beneficiary of such developments. As more information is linked to the IBM platform, customers increase in loyalty, which often lengthens the paid business relationship between the customer and IBM. The company also realizes returns by leveraging and applying intelligence from previously developed smart legal contracts (e.g., reusing existing smart contract code as a model) across multiple contracts and customers with similar transactional needs. Such versatile applications of contract innovations not only allocate costs across a range of customers but also reduce contract production time. Faster production time enables IBM to more quickly and easily create value for new customers, which attracts and incentivizes even more customers to join the platform. These realities place commercial entities, like IBM, in an optimal position to capture value and achieve financial returns from contract innovation.
D. IBM Integration with GitHub

A similar, but alternative, avenue IBM uses to introduce potential customers to its propriety platform is GitHub, a community repository for open-source computer code. IBM has developed and made available a series of sample distributed ledger contracts on GitHub. These sample contracts are freely accessible to the public and currently organized by and limited to a discrete number of industry use cases (e.g., aviation supply chain sample contract). In addition, the open-source community nature of GitHub allows individuals to contribute to the sample contracts, which may further enrich and optimize their effectiveness. IBM intends these sample contracts to be an introductory resource for potential customers looking to begin blockchain development and integration with Watson IoT. The company’s ultimate objective, however, is to transition non-paying users of these bare-bone samples to paying customers on IBM’s private platform, which offers far more applicable and customizable smart contracts. While, in theory, any IBM competitor could easily view and mimic the sample contracts on GitHub, such access is of no concern to IBM—the true proprietary information is the way in which IBM links

multiple smart legal contracts together, effectively enabling its customers to reduce mundane transaction costs and gain large-scale market efficiencies. Accordingly, a small selection of sample contracts in the hands of an IBM competitor is simply an insufficient amount of information to pose any real threat to the proprietary nature of the company’s services. Thus, the sample contracts made available on GitHub likely stand as an effective customer acquisition tool for IBM’s proprietary platform.

VII. DO PROPRIETARY CONTRACT PLATFORMS PROMOTE CONSUMER WELFARE?

Of course, the technology solutions offered by IBM and other commercial entities cannot possibly address all transactional needs of customers. Still, their solutions are incredibly effective at managing mundane transactions and, therefore, are likely to have a positive influence on consumer welfare. More efficient contracting, for example, reduces transactional costs between entities, which may result in more accessible and lower priced products and services for end customers. Less expensive contract production coupled with greater efficiency in development and management makes the technology an attractive supplement to—or even replacement for—the role of transactional law firms. With blockchain to manage their mundane transactions, customers utilizing these solutions no longer have the same need for a transactional lawyer to complete such work. Instead, customers are likely to turn to transactional law firms only for highly technical or complex transactions not easily addressed through a developed blockchain (i.e., those that require more senior and experienced partner hours). Collectively, these realities are likely to make legal services more affordable to the public at large.

The technology also addresses the burden of government regulation, which is often a significant barrier to market efficiency. Embedded trust and transparency within smart legal contracts will likely reduce current market dependency on regulation. Smart legal contracts make it more difficult for entities to breach; thus,
their increased use could reduce the amount of resulting litigation in the court system.

For legal professionals, the impact of the technology may appear less beneficial or even threatening to the industry’s current model. Traditional law firms generate revenue by billing clients by the hour. As such, greater efficiencies achieved through smart legal contracts may diminish the number of hours a firm bills its clients. Lower billable hours per client, however, could potentially be offset if firms increase the number of clients they serve. Either way, reduced customer reliance upon firms for mundane transactions poses an interesting conundrum for the role junior transactional lawyers will play in a firm. Since mundane transactional work is often assigned to junior lawyers—who to train them in the art and allow more experienced lawyers to focus time on the more challenging transactions—their role is potentially threatened if such work shifts away from law firms and toward commercial entities. Without access to mundane or “training wheels” work, junior lawyers may have a difficult time obtaining the experience necessary to support customers in complex transactions later in their career. Regardless, customers will no doubt come to expect that law firms nevertheless retain the expertise and knowledge to help develop contracts around new or existing blockchain infrastructures.\(^{193}\) Thus, law firms familiar with the technology will be best positioned, at least in the short-term, to serve client needs and adjust their business models to address the changing technological landscape.\(^{194}\)

VIII. CONCLUSION

Though few legal professionals seem concerned about maintaining or improving the quality of transactional legal services, Triantis concludes that an emphasis on innovation that

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improves contract quality—rather than simply reducing costs—will help lawyers more effectively adapt to industry cost pressure and emerging technologies. Yet, any law firm that wishes to pursue such innovation will likely be hindered by significant barriers in the legal industry—namely, the customary deployment of standardized, unchanging contract terms, the limited intellectual property protection available to drafters of novel contract language, market resistance to the adoption of novel terms, and structural features of legal entities that value client service over innovation. Amidst these barriers, Triantis posits that perhaps the only effective way for law firms to incentivize contract innovation is through collaborative contract design strategies like standardization and modularity. However, even these proposed strategies are unlikely to successfully incentivize law firms to innovate since they fail to assist firms in capturing and preserving the financial returns of any innovation.

In contrast to traditional law firms, commercial entities leveraging DLT and smart contracts are likely in a stronger position to capture financial returns from contract innovation. As the IBM case study illustrates, the business models of such entities inherently insulate returns from competitors in a way that eliminates many of the innovation barriers found in the legal industry. The emergence of this alternative channel for legal contract innovation suggests that, perhaps, Triantis’ concerns regarding a lack of innovation incentives are overstated. Rather than seek to overcome the innovation barriers that persist in an age-old industry, legal entities are likely to be more effective in contract innovation efforts if they leverage technologies external to the legal industry altogether. At first glance, this hypothesis may appear to threaten the current legal model by reducing reliance among contracting parties upon traditional transactional lawyers. Yet, the technology solutions of IBM and other commercial entities are only a practical threat to the more mundane and simplistic contracts currently provided by law firms. Instead of outright replacing legal services, DLT and smart contract technology will more realistically

195. Triantis, supra note 3, at 179–80; see also HARVARD LAW TODAY, supra note 4.
196. Triantis, supra note 3, at 202–04; see also Goetz & Scott, supra note 6, at 286–92.
serve as a supplement to the industry. Supplementing traditional legal services with these technologies will ultimately facilitate less expensive contract production, effectively promoting consumer welfare through more efficient contract enforcement, which is essential to long-term economic growth and development.

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