

FINANCIAL TECHNOLOGY REPORT

Prepared by:

The Center for Legal Innovation of Vermont Law School

In Consultation with:

The Commissioner of the Department of Financial Regulation, the Secretary of the Agency of Commerce and Community Development, and the Attorney General of the State of Vermont

Pursuant to:

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I. NOTES ON THE PREPARATION OF THIS REPORT

A. LEGISLATIVE CHARGE FOR A REPORT

In Section G.1 of S135 passed in 2017, the Vermont Legislature directed the Center for Legal Innovation at Vermont Law School, in consultation with the Commissioner of the Department of Financial Regulation (“DFR”), the Secretary of the Agency of Commerce and Community Development (“ACCD”), and the Attorney General’s Office (“AGO”), to submit a report to the General Assembly on possible legal and regulatory actions that could, on the one hand, create a hospitable climate for blockchain and other financial technology developments, while, on the other hand, protecting Vermonters from risks created by these innovations. The specific charge of the Legislature was that the report discuss:

“(A) findings and recommendations on the potential opportunities and risks presented by developments in financial technology;

(B) suggestions for an overall policy direction and proposals for legislative and regulatory action that would effectively implement that policy direction; and

(C) measurable goals and outcomes that would indicate success in the implementation of such a policy.”

This Legislative charge did not come in a vacuum. Vermont has a history of taking steps to make it hospitable to blockchain and other aspects of financial technology. As S135 notes:

“The existing Vermont legislation on blockchain technology and other aspects of e-finance have given Vermont the potential for leadership in this new era of innovation as well, with the possibility of expanded economic activity in the financial technology sector that would provide opportunities for employment, tax revenues, and other benefits.”

B. REPORT REFLECTS VIEWS OF THE CLI

This report has been prepared by the Center for Legal Innovation (“CLI”) at Vermont Law School. In gathering information and ideas for this project, the CLI has consulted with The Commissioner of DFR, the Secretary of ACCD, and the AGO, (collectively “the Agencies”), as directed by the charge for the preparation of this report. While the contributions of these officials and the Agencies have been of great assistance to the CLI in the creation of this report, the views expressed here are ultimately those of the CLI and do not necessarily represent the views of these officials or the Agencies, and they retain the right to comment further on, and

disagree with, the conclusions set out here. If the Legislature decides to pursue further any of the possible initiatives set out in this report, it is anticipated that these and other appropriate branches of the government of Vermont would be engaged for further comment and advice.

Additionally, the charge for this report recognized that the CLI and the Agencies “may consult such other constituencies and stakeholders within and outside the State as they may determine will be helpful to their considerations.” In this context, the CLI has gathered information and suggestions from a broad range of actors, including individuals affiliated with other academic institutions, advocacy groups, and private businesses. In particular, the CLI has sought input from the Vermont law firm of Gravel & Shea. Gravel & Shea, and its attorneys Peter Erly, Ethan McLaughlin, and David Thelander, have represented several commercial clients who have been attracted to Vermont by its existing blockchain recognition statute. The CLI concluded that the suggestions of these businesses, already drawn to Vermont, could be of particular value, and solicited Gravel & Shea to help elicit and frame those suggestions. Responding to this request, they have provided useful material, portions of which have been incorporated into this report, particularly in Sections IV B.2. A Specific Instance: Proof of Authority/Consensus, C.2. Insurance Products, and C.4. Digital Property Transfers and Registries. The CLI is grateful for their contributions to this project, which should be understood in this context. We are also grateful for the contributions of Kate Purcell and Champlain College, who organized and hosted a gathering of Vermont FinTech stakeholders that helped to launch the process of this report.

It should also be noted that Oliver Goodenough, co-Director of the CLI, has a financial interest in a legal technology company, Skopos Labs, Inc. None of the proposals set out in this report are related to the business carried on by Skopos Labs, which provides artificial intelligence analytic services concerning legislative and regulatory enactments to law firms and financial businesses. See www.skoposlabs.com

Finally, in drafting this Report, the CLI has chosen to present a broad range of possible initiatives. It is intentionally a smorgasbord rather than only one or two dishes. As we gathered information, we heard many suggestions for state-level legal action from those active in financial and distributed ledger technology. Although we have applied some filter, we also felt that our approach should be to provide a summary-level description of a range of possibilities rather than focusing on only a few. We provide this report as an educational exercise, and do not advocate for or against the adoption of any of the possibilities described. With further guidance from the Legislature, the CLI stands ready to assist in a deeper exploration of any of these particular topics.

C. TECHNICAL CONTENT IN THE REPORT

Of necessity, a report on financial technology must have significant technical content. This can pose challenges to the lay reader. We have incorporated direct explanations of some key concepts, and the particular suggestions for consideration contain some description of their technological underpinnings. Incorporating more detailed explanations would have made an already lengthy report even longer. For those seeking further explanation, in many instances the “Additional Resources” material appended to many of sub-parts of this report can provide a starting point.

Additional Resources:

Flynt, Oxcarr. *FinTech: Understanding Financial Technology and its Radical Disruption of Modern Finance* (2016). https://www.amazon.com/FinTech-Understanding-Financial-Technology-Disruption/dp/1535326476/ref=tmm_pap_swatch_0?encoding=UTF8&qid=&sr=

KPMG. *The Pulse of Fintech Q2 2017: Global analysis of investment in fintech*, August 1, 2017. <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/07/pulse-of-fintech-q2-2017.pdf>

Lewis, Anthony. “A gentle introduction to blockchain technology,” *Bits on blocks*, September 9, 2015. <https://bitsonblocks.net/2015/09/09/a-gentle-introduction-to-blockchain-technology/>

Shrier, David & Pentland, Alex, *Frontiers of Financial Technology*, 2016. <http://www.visionaryfuture.com/fintech.html>

II. SUMMARY OF THE REPORT

Blockchain and other financial technologies (“FinTech”) are creating significant changes in how our financial system works, with implications for currency, banking, insurance, and a number of other sectors. This creates both challenges and opportunities for Vermont. On the challenge side, there is the need for better protection of consumers, businesses and government in a world where these innovations can lead to financial bubbles and identity theft. On the opportunity side, these innovations have many positive elements, and Vermont has the potential to use its laws to support economic growth, both for existing Vermont enterprise and by attracting new players to our state.

Many of these FinTech developments rest on technological advances that can be opaque for those without a computer science background. Blockchain is a central technology in many of the suggestions. It is more properly called a “distributed ledger,” but the blockchain label is in common use at this point. The core concept is that a set of records (often a running ledger of

some kind) is lodged in a database that is recorded in a large number of computers (“nodes”) rather than a single database. In order to hack the ledger or other record, a bad actor would need to corrupt most of the system of nodes – a daunting task even when the system is an open one. When combined with other cryptographic techniques such as the creation of a short “hash” that can identify large pieces of text in a condensed way, distributed ledgers can give good solutions to many of the problems of running a financial system. A more detailed explanation, together with further resources, is provided at “How Blockchains/Distributed Ledgers Work” in III.A below.

In dealing with innovation, we recommend that the Vermont Legislature act carefully but still boldly in developing a legislative response to the opportunities and concerns raised by FinTech generally and blockchain in particular. In moving forward, we expect the Legislature to pick options for development that align well with the Vermont economy and with the principles of care and innovation that infuse our enterprises.

This report offers a number of different areas for consideration by the Legislature for possible action. Set out in detail in Section IV, they are:

- Regulatory Update and Efficiency
 - Review of Anti-Fraud Laws and Other Consumer Protections
 - RegTech Initiatives
- Enabling Provisions for FinTech and Blockchain Applications Generally
 - Blockchain and Cryptocurrency Governance
 - Proof of Authority/Consensus
 - e-Residency
- Enabling Provisions for Particular Activities and Business Areas
 - Identity Trust Companies
 - Insurance Products
 - e-Banking/FinTech Charters
 - Digital Property Transfers and Registries
 - Financial Trustee Safe Harbor
 - Autonomous Agent Corporations/LLCs
- Adoption of Blockchain, Cryptocurrency, and FinTech in Vermont
 - Government Processes and Functions
 - Private Sector Adoption
 - Education

If the Legislature decides to pursue further any of the possible initiatives set out in this report, it is anticipated that the Legislature would engage with the ACCD and its Department of Economic Development, DFR, AGO, and other appropriate branches of the government of Vermont for

further comment and advice. The CLI also stands ready to provide further research and education as the process goes forward.

III. INTRODUCTION AND BACKGROUND

A. OPPORTUNITIES AND CHALLENGES IN FINANCIAL TECHNOLOGY AND BLOCKCHAIN

Developments in financial technology, and in particular the distributed ledger approach often referred to as blockchain, are rapidly changing the financial industry. Old approaches to insurance, banking, trading, and even money itself are being upended and supplanted by technologically driven innovation. As this process goes forward, there is both the opportunity and the need for our legal institutions to keep up with these changes, both helping the growth of productive invention and protecting against the spread and consequences of destructive change.

On the opportunity side, there is the potential to capture economic activity and revenue to Vermont. While our state may not have Silicon Valley or Wall Street, it is already a moderate tech hub. In a Forbes Magazine review in 2015, Burlington ranked among the top 10 metropolitan areas for innovative technology development, and in July, 2016, the New York Times called the city a “smart green tech hub.” Between the manufacturing of companies like IBM/Global Foundries and the software services of companies like Dealer.com and IDX, Vermont has had more than its share of successful technology companies. In addition, our success in hosting captive insurance companies demonstrates that specialty finance fields can be lured to make their homes in Vermont as well. The benefits are not only available to new companies. Our existing banks, insurers, and other businesses can benefit from engagement with financial technology. Whether by accepting cryptocurrency for payment or by establishing identity trust functions, our incumbent enterprises can prosper in a legal environment that is open to thoughtful innovation.

There are also understandable concerns about the possibility that the developments of financial technology will open new dangers, both for intentional predation by unscrupulous actors and for unintended lapses and market failures. Vermont’s laws and regulations need to be responsive to providing protection as well as opportunity in times of change.

A final caution: If Vermont wishes to pursue FinTech initiatives, it would be wise to proceed with reasonable speed. Other states are picking up various pieces of the puzzle. To the best of our knowledge, the opportunities presented in the report are still open to leadership, but that openness will not continue indefinitely.

Additional Resources

Dill, Kathryn. "The 10 Most Innovative Tech Hubs In The U.S.," *Forbes*, February 12, 2015. <https://www.forbes.com/sites/kathryndill/2015/02/12/the-10-most-innovative-tech-hubs-in-the-u-s/#59e2c5ce5d7d>

Gustke, Constance. "A 'Smart' Green Tech Hub in Vermont Reimagines the Status Quo," *New York Times*, July 20, 2016. https://www.nytimes.com/2016/07/21/us/a-smart-green-tech-hub-in-vermont-reimagines-the-status-quo.html?_r=0

The FinTech Revolution

Technology is fundamentally changing many of the practices, players, and market of the financial industry. A detailed description of this revolution is beyond the scope of this report. A few snapshots and more detailed references will need to suffice for this purpose.

"One of the hottest topics I am often asked about today is financial technology or fintech, as it is widely known. Fintech is a broad term, but at its core, it refers to the use of technology to better deliver banking products and services. These services could be in the form of lending platforms, payment processes, investments and savings, blockchains, digital currencies, or a host of other areas. In all of these sectors, fintech has the potential to transform financial products and services for consumers and small businesses.

Think about it. Consumers can now use their smartphones and other mobile devices to manage their money, transfer funds, or obtain a loan. This type of accessibility has altered their expectations and demands about when and how they should be able to conduct financial transactions. In my view, the expectation for an on-demand experience is just one of the permanent changes driving today's innovation." Teresa Curran, Executive Vice President and Director, Financial Institution Supervision and Credit, Federal Reserve Bank of San Francisco.

<https://consumercomplianceoutlook.org/2016/third-issue/fintech-balancing-the-promise-and-risks-of-innovation/>

"Following 3 relatively lackluster quarters, the global fintech market rebounded strongly in Q2'17, with investment more than doubling quarter over quarter to \$8.4 billion. While the number of fintech deals remained well off of the peaks experienced in 2015,

deal volume remained healthy during Q2 with 293 transactions.” KPMG 2nd Quarter FinTech Report.

“Study the technology space right now and you’ll probably notice that a lot of energy and financial resources are being poured into financial technology — i.e. FinTech. There’s a lot of anticipated growth in this niche and businesses are hoping to increase their market share.” Newsmax <https://www.newsmax.com/LarryAlton/fintech-financial-technology-trends-credit-repair/2017/09/11/id/812910/>

“Financial technology may still be in its early stages, but 2016 was nonetheless a whirlwind year for the FinTech world. And it’s about to get even better. According to the annual FinTech Report, cumulative investment globally will exceed \$150 billion in 2017.” Fortune <http://fortune.com/2017/03/10/financial-technology-trends/>

Additional Resources:

Chishti, Susanne & Barberis, Janos. *The FINTECH Book: The Financial Technology Handbook for Investors, Entrepreneurs and Visionaries*, Wiley, May 2016.

<http://www.wiley.com/WileyCDA/WileyTitle/productCd-111921887X.html>

Fintechnews Switzerland. “12 New Fintech Books To Read in 2017,” *Fintech Switzerland*, December 27, 2016. <http://fintechnews.ch/fintech/12-new-fintech-books-to-read/8694/>

IBM Institute for Business Value & The Economist Intelligence Unit. *Leading the pack in blockchain banking: Trailblazers set the pace*, 2016. <https://www-01.ibm.com/common/ssi/cgi-bin/ssialias?htmlfid=GBP03467USEN&>

KPMG. *The Pulse of Fintech Q2 2017: Global analysis of investment in fintech*, August 1, 2017. <https://assets.kpmg.com/content/dam/kpmg/xx/pdf/2017/07/pulse-of-fintech-q2-2017.pdf>

How Blockchains/Distributed Ledgers Work

While there are many flavors in the FinTech revolution, a principal focus has been on the use of blockchain technology. “Blockchain” is a label often applied to “distributed ledger” techniques for keeping hard-to-corrupt records open for public consultation. There is a wealth of descriptions of blockchains available through government studies, academic articles, business journalism, etc., etc. One of the most accessible appears in the May 29, 2017 *MIT Technology Review*:

“The big challenge with digital currency is to prevent unauthorized copying. Cryptocurrencies use two mechanisms to prevent this.

The first is to publish every transaction in a public record and to store numerous copies of this ledger online in a way that allows them all to be automatically compared and updated. This prevents double spending—using the same bitcoin to buy two different things.

The second mechanism is to protect the ledger cryptographically. Every update collects together a range of new transactions and adds them to the existing ledger. But to do this, the earlier version of the ledger is first frozen and encrypted.

The new version of the ledger—called a block—includes the encrypted copy of the earlier ledger. Anybody can use this encrypted data to generate a number that can be used to check the veracity of the block. However, it is extremely hard to generate this number computationally in an attempt to game the system. It is this feature—that the blocks are easy to check but extremely hard to copy—that secures the system.

Of course, as the ledger continues to be updated, new blocks must be created, piggybacking on the old ones and creating an unbroken chain of blocks. Hence, the term blockchain technology.” <https://www.technologyreview.com/s/607947/the-cryptocurrency-market-is-growing-exponentially/>

As some of the sections of this report point out, there are many possible architectures for creating a computer-based distributed ledger. Exploring these more fully is beyond the scope of this report, but those interested in exploring further there are now many resources from a variety of sources.

Additional Resources:

“The Cryptocurrency Market Is Growing Exponentially,” *MIT Technology Review*, May 29, 2017. <https://www.technologyreview.com/s/607947/the-cryptocurrency-market-is-growing-exponentially/>

BlockGeeks. “What is Blockchain Technology? A Step-by-Step Guide For Beginners,” *BlockGeeks*, 2017. <https://blockgeeks.com/guides/what-is-blockchain-technology/>

Chemitiganti Vamsi. “The Architecture of Blockchain..(4/5),” *Vamsi Talks Tech*, January 28, 2016. <http://www.vamsitalkstech.com/?p=1615>

Swan, Melanie. *Blockchain: Blueprint for a New Economy*, 2015. <http://shop.oreilly.com/product/0636920037040.do>

B. CREATING ECONOMIC ACTIVITY IN VERMONT

Fostering economic development is a central goal of law change to help enable FinTech and blockchain business in Vermont.

Law as a Catalyst for Growth

Regulatory and legislative innovation can help to bring expanded economic activity. Paul Romer, Chief Economist for the World Bank has summed up this connection:

“Economic growth is driven by the coevolution of two sets of ideas, technologies and rules. Governments can increase the rate of growth—in ways that benefit all citizens—by creating systems of rules that are both encouraging of and response to innovation; the various goals do not always line up.”

In seeking to create rules that both encourage, respond, and lead to growth, we can target three kinds of benefits.

The first target involves direct benefits. Here we seek to stimulate economic enterprises to grow in Vermont, whether by enabling existing Vermonters to build businesses or non-profits, or by luring activity from outside the state. For an enabling law to accomplish this, it should create some kind of benefit that is conditioned on a significant presence of the enterprise within the state. Sometimes this happens naturally: a particular form of trust company would need to be located in Vermont to have full benefit of a Vermont enabling statute. In other cases, the business may exist largely outside Vermont, but a particular license or authorization can be made dependent on a Vermont presence. Our captive insurance laws follow this pattern. The challenge in such a case is setting the cost of the Vermont presence to the enterprise sufficiently large so as to be meaningful for our economy while remaining sufficiently moderate so as not to discourage it from happening. This is not always an easy line to meet.

The second target involves indirect benefits. While not directly present in Vermont, an enterprise may nonetheless support other businesses in Vermont. Law and accounting firms can give advice; banks can keep deposits; hospitality can serve part-time visitors. While not as obvious as direct benefits, these services can support a thriving economic sector, such as the insurance business in Bermuda.

The third target involves assisting existing Vermont enterprise. This is also less directly eye-catching than a new start up or a big investment from outside the state, but incremental improvements and opportunities for our established businesses and nonprofits help them continue to prosper and grow, and constitutes a worthy goal for economic development.

Creating Revenues for the State of Vermont

In addition to general economic activity, using our laws to encourage enterprise will also lead to increased revenues for the State and other governmental units through taxes and fees. Some of these can be direct: Special fees or taxes that apply to the new kind of license, organizational structure or transaction. Again, the trick is to find a Goldilocks balance of burden and benefit, and some imagination may be helpful. One could image, for instance, creating a law that gives an attractive framework for a cryptocurrency network that allowed Vermont to collect a relatively small per transaction fee, perhaps paid in the cryptocurrency itself, much as the miners and nodes get paid a very small fee in the currency for their efforts. Linking it the currency itself would minimize the burden that out of pocket dollar amounts would require while still giving the State a stream of value.

Making activity that takes place outside of Vermont subject to Vermont income tax is possible, but this kind of outright capture will put Vermont at a disadvantage when compared with a state like Delaware that relies on fees and franchise taxes as a revenue source and leaves out of state profits untaxed for corporations formed under Delaware law.

Too aggressive a taxation approach will discourage out-of state investment; too timid will make the effort less worthwhile for our State to engage in.

Better Protection for Vermonters

Whether or not we seek to encourage FinTech activities in Vermont, the world will bring many of them to our doors anyway. Cryptocurrencies, for instance, will be used by some. The Initial Coin Offering (“ICO”) trend is called a bubble by many. Identity will be exploited and protected. eBanking is with us. Our Attorney General and financial regulators are already responding to these challenges. Seeking their input, both in shaping any encouraging legislation and in crafting general protective provisions, is critical. Vermont is not alone in facing these concerns, and there are model laws and other national standards that can help provide guidance. On the other hand, to the extent that the national response is overprotective, or even unjustifiably reactive and prohibitive, that can create an opportunity for Vermont to attract business through a more nuanced approach, as has been the case with our captive insurance laws.

Availability of Investment Capital and Other Financial Resources

FinTech is all about using the power of computing and communications to create more effective means for collecting and deploying capital. The availability of capital for investment is a chronic challenge for Vermont enterprises. To the extent that there is increased FinTech business in Vermont, it is likely that the capital deployed through these efforts will create spill over into the development of other sectors as well. This increase can range from better and more competitive practices at local banks throughout the state to cryptocurrency finance in its many forms.

Other Benefits

In addition to the standard measures of economic development, encouraging innovation in sectors such as finance and law can have spill-over effects on other challenges Vermont faces. Opportunity in exciting new sectors can help us keep and lure the young population we see going elsewhere. The Burlington area is already attractive for such people; if we can reinforce that and spread it further around the State that would be a plus. FinTech can help make Vermont “hip” in demographics that matter for our future vitality.

A lively FinTech sector would also have benefits for our education system; whether at UVM, VTC or VLS, links out from our colleges and universities into an innovative area of commerce would help stimulate them to further innovation in what can be a virtuous circle of creation and learning.

C. OPPORTUNITIES, RISKS AND RECOMMENDATIONS

We believe that there is significant promise for economic impact from FinTech and blockchain activity in Vermont. *Vermont 2020*, the Comprehensive Economic Development Strategy (“CEDS”) released in 2016, identified Financial Services and Insurance as a targeted area for attention. The CEDS pointed to the history of captive insurance in Vermont:

“A few companies began testing the feasibility of the captive insurance model in the late 1970s. Aware of the business opportunity, the Vermont Legislature responded with laws that provided predictability and a fair regulatory environment. As the field grew, expertise for forming and managing captives became centered in Vermont and the state maintains its competitive advantage with responsive legislation, clear regulation and a knowledge base to keep new captives locating in the state.” At page 92

The hope of this initiative is that Vermont could repeat this history, substituting “blockchain” or other FinTech developments into the paragraph in the place of “captive insurance.”

The 2020 CEDS observed:

“Future competitiveness in this sector will require the state to create additional financial management tools. Vermont will benefit from using the history of captive insurance management and applying its lessons to financial services companies to cultivate new equity and debt services. As the Finance and Capital section of the Vermont CEDS outlines, the state is poised to move forward on providing a spectrum of capital options for Vermont businesses, and the financial services sector may be poised to take advantage of a new, robust financial services toolbox.” At page 93.

Financial sector growth is particularly attractive. “The financial services sector enjoys an average annual salary of \$67,601 compared to the overall state average of \$42,056.”

In order to capture some of this potential, the task for the Legislature is to determine what are the best opportunities for shaping a legislative response to FinTech and blockchain technology? This report sets out a number of possible initiatives which we feel have the potential to fill necessary gaps in the marketplace and to bring benefits to Vermont. Some have the possibility for larger impacts than others, either through the scale of the activity or the degree to which it will directly affect Vermont jobs and taxes; we nonetheless believe all are worth considering.

There are also risks involved in this strategy. To begin with, the financial sector is attractive to would-be predators. As the famous quote attributed to Willie Sutton, put it, he robbed banks “because that’s where the money is.” As the recent hack of Equifax and the attacks on cryptocurrencies detailed below at IV.B.1 illustrate, this rule is alive and well. FinTech will inevitably experience more attempts at fraud and thievery, but so does traditional banking. Care will need to be taken to assist and insist that the players in FinTech operating under Vermont law take all reasonable steps to safeguard their operations. One of the attractions of blockchain based enterprise is the security that distributed ledgers offer on underlying data protection.

Furthermore, competition from the new business models and techniques will inevitably harm some of our existing Vermont businesses in the process of “creative destruction” that accompanies economic innovation. We suggest that the proper response is to encourage Vermont enterprise to get ahead of the curve, and to provide the legal frameworks within which successful innovation by both established players and new entrants can occur. If not Vermont, some other state will create the opportunities, although perhaps with less care for consumer protection and positive social impact, and certainly with less benefit to Vermonters.

Finally, even with the greatest care, we will make some mistakes as we go forward. The mistakes of activity are sometimes more noticeable than the mistakes of standing still, although both can be harmful.

Teresa Curran, Executive Vice President and Director, Financial Institution Supervision and Credit, Federal Reserve Bank of San Francisco, frames the dilemma through the lens of her agency’s role:

“Some of the latest innovations offer consumers convenience, speed, and reliability, and provide banks the ability to access and analyze big data quicker and sometimes cheaper than ever before. Other innovations can address some of the financial system’s long-standing challenges, including the ability to facilitate direct payments between buyers

and sellers and to direct households' and businesses' savings to their most productive uses, such as building homes, expanding businesses, or obtaining an education.

But our excitement is tempered by our resolve to balance these promises by understanding and mitigating the risks of innovation. In certain terms, our goal is simple: to ensure that consumers are protected and that the safety and soundness of banks is maintained. Toward that end, the Federal Reserve System is fully analyzing fintech innovations and their impacts in different areas, including supervision, community development, financial stability, and payments. This effort aligns directly with our role in maintaining the stability of the financial system and containing systemic risk that may arise in financial markets.”

Our general recommendation is that the Legislature act carefully but still boldly in developing a legislative response to the opportunities and concerns raised by FinTech generally and blockchain in particular. In moving forward, we expect the Legislature to pick options for development that align well with the Vermont economy and with the principles of care and innovation that infuse our enterprises. The specific recommendations offered below have been selected for the potential to meet these criteria.

Additional Resources:

Curran, Teresa. “Fintech: Balancing the Promise and Risks of Innovation,” *Consumer Compliance Outlook*, 2016. <https://consumercomplianceoutlook.org/2016/third-issue/fintech-balancing-the-promise-and-risks-of-innovation/>

Vermont 2020: Comprehensive Economic Development Strategy, February, 2016.
<http://accd.vermont.gov/sites/accdnew/files/documents/DED/CEDS/CEDS2020FullReport.pdf>

FinTech Risks and Opportunities: An Interdisciplinary Approach. A conference hosted by the U.S. Office of Financial Research and the University of Michigan’s Center on Finance, Law, and Policy at the Gerald R. Ford School of Public Policy, November 16 & 17, 2017.
<http://financelawpolicy.umich.edu/wp-content/uploads/sites/26/2017/11/FinTech-Conference-Agenda-FINAL.pdf>

Hardjono Thomas, Shrier David, Pentland Alex. *Trust::Data: A New Framework for Identity and Data Sharing*, January 2017. <http://www.visionaryfuture.com/trust--data.html>

D. THE CHALLENGE OF CAPTURING BENEFITS: MEASURABLE OUTCOMES

Economic development metrics are always difficult to apply, and with the diverse options and opportunities for encouraging FinTech activity in Vermont, measurable outcomes will inevitably range considerably. The Vermont Futures Project (<https://vtfuturesproject.org>) of the Vermont Chamber Foundation has developed a series of metrics and presentational approaches, including data on tech jobs and entrepreneurship in Vermont. It presents many of these on an innovative “Vermont Economic Dashboard” (<https://vtfuturesproject.org/economic-dashboard/>) and additional web pages (<https://vtfuturesproject.org/vermont-economic-snapshot/>). Drawing on their examples, we suggest setting benchmarks around the following measures:

- Employment levels in FinTech and blockchain enterprises
- Firm creation in FinTech and blockchain
- Investment in new and existing businesses in FinTech and blockchain
- Tax and fee revenues from FinTech and blockchain

On this last measure we note that matching a successful, tax-paying business to a particular piece of legislative enactment can be difficult.

As the Legislature goes forward with FinTech and blockchain initiatives, it should work with the ACCD, Department of Economic Development, and other appropriate agencies to develop procedures for collecting and analyzing data related to these metrics. In this process, it is worth noting that a piece of financial technology can be a source of data in its own right through its operation. This idea of building reporting into the active technology is explored more fully at Section IV.A.2 below.

Additional Resources:

Donahue, Ryan & McDearman, Brad. “Performance measurement in economic development – even the standard can’t live up to the standard,” *The Avenue*, The Brookings Institution, August 30, 2016. <https://www.brookings.edu/blog/the-avenue/2016/08/30/performance-measurement-in-economic-development-even-the-standard-cant-live-up-to-the-standard/>

IV. POSSIBLE LEGISLATIVE ACTIVITY

This section provides the “smorgasbord” of suggestions for legislative activity. Many of the possibilities involve frameworks that would enable and support financial technology and blockchain. Even in these cases, a careful examination of potential risks should be undertaken. We also open our recommendations by suggesting a thorough review of existing law to see if

protections against fraud and other predation need updating or supplementing in light of FinTech, blockchain, and big data more generally.

Since many of the proposals discussed in this report relate to regulated financial entities, if the Legislature decides to pursue any such proposal, close consultation with DFR will be crucial to ensure the appropriate level of regulatory authority, discretion, and consumer protection.

The suggestions are presented in the following order:

- Regulatory Update and Efficiency
 - Review of Anti-Fraud Laws and Other Consumer Protections
 - RegTech Initiatives
- Enabling Provisions for FinTech and Blockchain Applications Generally
 - Blockchain and Cryptocurrency Governance
 - Proof of Authority/Consensus
 - e-Residency
- Enabling Provisions for Particular Activities and Business Areas
 - Identity Trust Companies
 - Insurance Products
 - e-Banking/FinTech Charters
 - Digital Property Transfers and Registries
 - Financial Trustee Safe Harbor
 - Autonomous Agent Corporations/LLCs
- Adoption of Blockchain, Cryptocurrency, and FinTech in Vermont
 - Government Processes and Functions
 - Private Sector Adoption
 - Education

A. REGULATORY UPDATE AND EFFICIENCY

A.1. Review of Anti-Fraud Laws and Other Consumer Protection Provisions

The developments of FinTech and blockchain are not only creating possibilities for new services and increased efficiencies; they are also creating new contexts within which the perennial challenges of financial fraud and predation can occur. There are a number of private and public initiatives which are surveying the dangers, ranging from data breaches and identity theft to new versions of old-fashioned cons. DFR and AGO have initiatives of their own in this field. DFR regularly releases consumer warnings and devotes web resources to cataloging current scams and breaches in the marketplace. See <http://www.dfr.vermont.gov/banking/consumer->

[resources/consumer-alerts](#). AGO similarly tracks breaches and fraud, alerts consumers, and provides rapid response portals and contact information. Just this past summer, AGO collaborated with the Department of Public Safety and the University of Vermont to launch VT Scam Alerts. See <https://www.uvm.edu/consumer> and <https://www.uvm.edu/consumer/forms/sign-scam-alerts>.

We recommend that the Legislature work with DFR and AGO to review the statutory basis of Vermont’s anti-fraud and consumer protection laws to see what updates, changes or additional protections should be enacted to bring our suit of protections current. This review could also seek to enact new protections as well, specifically tailored to concerns emerging from the internet, smart phones and big data, such as cybersecurity and data privacy. These would be elements in other laws suggested in this report; the efforts would be complementary.

In addition to Vermont government, other parties could assist in the survey and rule development. The Vermont Law School CLI would be happy to participate in such a program, and we anticipate that other educational institutions as well as commercial and professional organizations would be willing participants as well.

Additional Resources:

Financial Crimes Enforcement Network (FinCEN) of the U.S. Treasury <https://www.fincen.gov/>

Financial Fraud Enforcement Task Force <https://www.stopfraud.gov/sf>

Financial Industry Regulatory Authority (FINRA) <http://www.finra.org/>

A.2. RegTech Initiatives

The field of regulatory technology (“RegTech”) is often linked with FinTech and blockchain. RegTech involves employing the power of computation and digital communication to embed regulatory processes in software. At its most effective/intrusive, the regulatory oversight can be “baked in” to the enterprise management systems of the regulated company. Banking and financial market regulation are natural targets for such compliance approaches. For instance, there has been significant RegTech development activity in the “know your customer” (KYC) space around banking. Automated KYC initiatives tie in with the identity management approaches explored at Section IV.C.1.

A number of prominent software providers are actively developing RegTech solutions. By way of example, in 2016 IBM purchased Promontory, a Washington, DC based company specializing in regulatory technology. The plan is to use the super-computer capacities of IBM’s Watson to

drive RegTech solutions. As the IBM announcement of the deal described it, “the capabilities of Promontory combined with IBM's deep industry expertise and Watson’s cognitive capabilities will directly address the massive operational effort and manual cost of escalating regulation and risk management requirements.”

We suggest that the Legislature educate itself around RegTech approaches to improving the interaction between government and its regulatory targets, and that the Legislature consider RegTech approaches for implementation of changes emerging from the process described in Section IV.A.1 above.

Additional Resources:

Deloitte. “RegTech is the new FinTech: How agile regulatory technology is helping firms better understand and manage their risks,” *Deloitte Insight*, 2016.

https://www2.deloitte.com/content/dam/Deloitte/ie/Documents/FinancialServices/IE_2016_FS_RegTech_is_the_new_FinTech.pdf

IBM. “IBM Announces Planned Acquisition of Promontory to Transform Regulatory Compliance with Watson,” *IBM Newsroom*, September 29, 2017. <http://www-03.ibm.com/press/us/en/pressrelease/50599.wss>

Willems, Jesse. “RegTech for Fintech May Be the Next ‘Big Thing’ in the Bitcoin and Blockchain Space,” *Bitcoin Magazine*, April 28, 2017. <https://bitcoinmagazine.com/articles/regtech-fintech-may-be-next-big-thing-bitcoin-and-blockchain-space/>

B. ENABLING PROVISIONS FOR FINTECH AND BLOCKCHAIN APPLICATIONS GENERALLY

B.1. Blockchain and Cryptocurrency Governance

Blockchains in general and cryptocurrencies in particular come in a wide variety of structures and “flavors”. While some have been launched on a proprietary basis and managed centrally through traditional business organization structures, a number, including the highly visible BitCoin and Ethereum coins exist largely as a loose network of independent operators. The technological infrastructure provides the operational framework, rather than any word-based statement of governance principles or structures.

This organizational looseness could pose a number of significant challenges for participants in such a cryptocurrency. One could be collective liability without any of the shielding for participants provided by a corporation or LLC. It is widely recognized in US law that when a group of actors comes together to create “an association of two or more persons to carry on as

co-owners a business for profit,” then they will be deemed to be a partnership. See, e.g. RUPA § 202 (a). The problem with this result for its participants, is that a simple partnership creates unlimited mutual liability for all the partners for the debts of the partnership, and unlimited mutual agency for the creation of those liabilities connected sufficiently with the business of the partnership. If the miners and nodes of a cryptocurrency were deemed to be partners in its business, they could face the potential of daunting liability.

Furthermore, unclear governance has created challenges for a system like Ethereum when faced with the need to correct a clear wrong in the workings of the currency. Notable examples of this have occurred twice within Ethereum. In 2016 a predator exploited a software flaw in Distributed Autonomous Organization (DAO), an organization offering investment in Ether, to misdirect at least \$89 million into improper ownership. In 2017, an attack on vulnerable “wallets” holding the currency siphoned off \$31 million in coins before being thwarted. In each of these cases, a counterattack was mounted by a collective of counter-hackers who were able to prevent further harm and correct at least significant portions of the theft that had gone forward. While admirable in most people’s eyes, these countermeasures were essentially extra-legal, constituting a “posse” of actors undoing the permanence of the ledger that is supposed to be the core safeguard of a blockchain currency.

Other governance concerns have arisen as currencies seek to change their architecture to promote efficiencies in recordation and mining or to change the proof of work approaches for better security. The need for better governance was referenced in the January, 2017 FINRA report *Distributed Ledger Technology: Implications of Blockchain for the Securities Industry*:

“For example, recent events have shown that lack of a central governing body for the evolving Bitcoin Network has created concerns for the network, as participants try to determine an approach to handle increased transaction volume. Therefore, a DLT network based on the use of a trustless network, where no party is responsible or accountable for the proper operation of the system, may present risks to markets and investors.”

There is an opportunity for a jurisdiction to create a business organization form, such as a trust, corporation or LLC, that could solve these concerns, while still permitting the decentralized aspects to go forward. A possible version of this would be a Digital Currency LLC (“DCLLC”). Such an organization could be designed to work within the existing LLC laws, but with a specific sub-chapter of rules for a DCLLC. Provisions of such a subchapter could include:

- Permitting the governance to be provided in whole or in part through the technological architecture of the system.

- Allowing the assignment of the roles of members and managers to participants – nodes, miners, etc.
- Granting limited liability protection to these participants, and authorizing the limitation of their agency authority with respect to the system as a whole.
- Granting authority for the kinds of counter-hacks that the Ether system has carried out when under attack.
- Creating governance procedures for innovations and changes in the currency architecture.

In terms of benefits to Vermont, some portion of the activities (such as a node or other presence) in Vermont could be required. Revenue to the state should be addressed. If Vermont income tax were charged across the entire activity of the network, rather than that just directly based in the State, that would probably scare away most currencies. A provision limiting the reach of Vermont taxation would probably be necessary. In the alternative, however, Vermont could potentially charge a light tax directly on transactions, or the creation of currency. This tax would be even more acceptable if it were *paid in the currency itself*, and particularly through the *creation of new currency in the system that would go to Vermont*, along the lines of the payment to miners and node holders in most such systems. Such an approach could be reasonably lucrative for Vermont and relatively painless to the currency participants.

Investor protection should be considered as well, although existing standards of fraud and disclosure can do significant portions of such work. A directed review of these laws is considered at IV.A.1 in this Report.

If pursuing this alternative were of interest to the Legislature, it would be possible to connect with key players in existing currencies, promoters of future currencies, academics, and lawyers who specialize in cryptocurrencies, along with Vermont and national regulators, to assess what would make a currency structure flexible, safe, and attractive to users, while providing tangible benefits to Vermont.

Additional Resources:

Bramanathan, Reuben et al. *A Securities Law Framework for Blockchain Tokens*, Dec. 7, 2016. <https://www.coinbase.com/legal/securities-law-framework.pdf>

Hacker, Philipp. "Corporate Governance for Complex Cryptocurrencies" *Oxford Business Law Blog*, Aug 18, 2017. <https://www.law.ox.ac.uk/business-law-blog/blog/2017/08/corporate-governance-complex-cryptocurrencies>

Reyes, Carla L. "Moving Beyond Bitcoin to an Endogenous Theory of Decentralized Ledger Technology Regulation: An Initial Proposal," *Villanova L. Rev.* 61: 191 (2016).

<https://digitalcommons.law.villanova.edu/vlr/vol61/iss1/5/>

Samans, Richard & Krieger, Zvika. "Realizing the Potential of Blockchain: A Multistakeholder Approach to the Stewardship of Blockchain and Cryptocurrencies," *World Economic Forum White Paper*, June 2017.

http://www3.weforum.org/docs/WEF_Realizing_Potential_Blockchain.pdf

B.2. Proof of Authority/Consensus

A specific area of opportunity for Vermont to provide clarifying rules for blockchain governance involves "consensus" technologies. In the blockchain world, the need for rules on "consensus" arises if the blockchain develops variations at one or more nodes. The "nodes" are the computers linked to the network where the records of the blockchain ledger are stored for retrieval. The process works as follows: Once a record is added to the blockchain it cannot be modified and therefore it is very difficult to falsify entries. When the database (blockchain) entry needs to be updated, a new record must be appended to the existing information. Each successive entry can be viewed and verified by any person. This transparency means that public blockchains are secure and, importantly, auditable.

This use of decentralized databases, however, includes a material risk of "a single potential point of failure." While a traditional centralized database involves a known, presumably trustworthy user-controlled and operated access system, unknown parties operate a blockchain-enabled distributed database. While a blockchain-enabled platform cannot be hacked, manipulated, or otherwise disrupted in the manner that a database built and operated by a single organization, person or other entity can be disrupted, the records kept at individual nodes can be modified by those controlling that node (just as a central database can be corrupted).

This lack of trust of any individual point inherent in the blockchain system is where the need for innovative "consensus" technologies has arisen. Since any entity, individual, or party can add or append any information to the blockchain, the distributed operators of the blockchain have developed algorithmic solutions to evaluate and authenticate all information submitted before the information is permanently recorded into the distributed ledger blockchain. The process of reviewing and validating this new information prior to acceptance is deemed "consensus."

Currently there are four well known applications/algorithms for establishing consensus in a blockchain: 1) "proof-of-work"; 2) "proof-of-stake"; 3) "delegated proof-of-stake", and 4)

“practical byzantine fault tolerance.” To be expected with emerging technology innovation, these systems differ in how their specific algorithms were developed and the problems they were designed to solve. For example, one application requires all parties on the network (nodes) to submit their individual conclusions in order for a consensus to be reached; another one does not so require. Participants who publicly verify the information on behalf of the network are in turn rewarded for their participation with newly created (‘mined’) cryptocurrency.

This is an area wide open for innovation as blockchain-enabled consensus technologies continue to gain market acceptance and demonstrate their ability to drive innovation and efficiencies. As these technologies gain market acceptance, they will also continue to grow in scale and complexity. Companies, institutions and governmental entities investing in consensus technologies are selecting applications that meet their (or their customers’) needs for enhanced customer experience, efficiency, and security.

As evidence of the innovation surrounding this area, another consensus technology under development is the “Proof of Authority” (“POA”) application/algorithm. POA leverages a circle of human “validators” who independently validate transactions before they are permanently appended to the blockchain. Each validator could be certified in some manner, such as by licensure as a notary, to add trust to the consensus process. Moreover, a POA consensus algorithm may facilitate a faster, more scalable and more cost-efficient blockchain and, therefore, attract businesses that would like to utilize the blockchain disrupt or improve various industries. The POA algorithm is potentially applicable to a broad range of uses by industries, institutions and government agencies. Some examples may include insurance, real estate, education, supply chain, medicine, and many others. A use under current development by a POA company is an application tailored to the notary industry that will make it faster, easier and cheaper for customers to complete notary transactions.

These are just several examples of consensus technologies that could be utilized by a blockchain established under Vermont authority. An innovative legislative and regulatory structure designed to be open to these and future architectures could help make a Vermont legal locus even more attractive to blockchains of all kinds.

Additional Resources

Hammerschmidt, Chris. “Consensus in Blockchain Systems. In Short.” *Medium*, January, 2017. <https://medium.com/@chrshmmmr/consensus-in-blockchain-systems-in-short-691fc7d1fefe>

Pilkington, Marc. “Blockchain Technology: Principles and Applications” (September 18, 2015). *Research Handbook on Digital Transformations*, edited by F. Xavier Olleros and Majlinda Zhegu. Edward Elgar, 2016. Available at SSRN: <https://ssrn.com/abstract=2662660>

B.3. e-Residency

The small European country of Estonia has introduced the concept of “e residency”. As described in Wikipedia:

“The program allows non-Estonians access to Estonian services such as company formation, banking, payment processing, and taxation. The program gives the e-resident a smart card which they can use to sign documents. The program is aimed towards location-independent entrepreneurs such as software developers and writers.”

Further information about the e-residency program is available from the Estonian government at <https://e-resident.gov.ee/>.

While Vermont cannot offer benefits of citizenship, it can offer lesser benefits of residency, both to existing US citizens and, perhaps on a more qualified basis, to applications from around the world. A Vermont driver’s license or ID could be offered, for instance, as well as access to jurisdiction for some regulatory treatments. On the benefit side, fees, and perhaps even some taxes, could be collected. The approach could attract international business people and might have particular attraction to our near neighbors in Canada. It could be a part of a “Vermont is a little state at the cutting edge” image play, and could even have attraction to US citizens living in other states attracted to the Vermont brand of individualism and collective care recognized by our motto: “Freedom and Unity.”

There are some risks: Vermont would not want such e-Residency used to drain financial benefits from the state or to provide cover for illicit activities. To avoid such “downside” concerns, if this approach were taken, the benefits should **not** include most state expenditure programs, and some kind of “know your customer” diligence would help to prevent undesirable users.

If the Legislature were to pursue this approach, the Estonian experience would be a useful starting point, but tailoring the opportunity to what Vermont can offer in our Federal system would be important.

Additional Resources:

Alender, Avo. “What is Estonian e-Residency and how to take advantage of it?” *LeapIN*, July 3, 2017. <https://www.leapin.eu/articles/e-residency>

Sullivan, Clare Linda and Burger, Eric W. “E-Residency and Blockchain,” *TPRC 44: The 44th Research Conference on Communication, Information and Internet Policy*, 2016. <https://ssrn.com/abstract=2757492>

C. ENABLING PROVISIONS FOR PARTICULAR ACTIVITIES AND BUSINESS AREAS

C.1. Identity Trust Companies

Identity protection is one of the most important challenges of the digital age. The most obvious aspects of the problem involve the raiding of information about identity from governmental and private repositories. The revelation of hacks into the databases of Equifax and Uber are just the most recent in a long string of such announcements.

While such identity theft is clearly a concern, equally challenging is the exploitation of identity and personal information by companies and governments under the color of consent. The terms of service of many, may apps and websites used by billions of people daily permit the collection and analysis of personal data by companies. These uses range from building anonymized, high level models of behaviors and trends to highly specific targeting by ads and other commercial probes. This is particularly the case with popular “free” apps and sites. There is an old saying from the word of television that if the service is free, then you are the product, and this is equally true for the new media of the internet.

It is possible to use technology, supported by law, to create countervailing power in the individual. Among the most promising approaches are proposals to use combinations of cryptography and distributed ledger technologies to create secure yet accessible identity repositories, where the individual would be able to reveal and confirm information about herself on a more limited, as needed basis. The Open Identity Exchange (OIX) is a noteworthy example of such an initiative. See <http://www.openidentityexchange.org/>

The OIX or and other similar initiatives all depend on creating a legally-enforceable framework that establishes enforceable duties on the identity-holding enterprise to maintain and administer the data for the benefit of the individual. This network of legal responsibilities is described by OIX as a “trust framework.” See http://www.openidentityexchange.org/wp-content/uploads/2017/06/OIX-White-Paper_Trust-Frameworks-for-Identity-Systems_Final.pdf

While the current OIEX structure could look to contract to create these duties, it would be more effective if a layer of state-sanctioned *fiduciary* duties could be invoked in such context. Under well-established law, fiduciary duties obligate the fiduciary to act for the benefit of the beneficiary, and to set aside opportunities for individual gain from the maintenance and development of the assets in the “trust” or other fiduciary property.

In a classic monetary trust, the fiduciary or “trustee” holds and administers money or other property for the financial benefit of one or more individuals. Such arrangements have long had legal recognition under standards that define and enforce fiduciary duties. In Vermont, Title 7A of the Vermont Statutes is devoted to these relationships. Fiduciary duties are also applied in other contexts, such as the duties of an agent to her principal, the duties of partners to each

other, and the duties of a director or officer to a corporation. Lawyers owe fiduciary duties to their clients.

Commercial and non-profit enterprises have grown up over the years that have state authority to provide fiduciary services. “Trust Companies” typically have specific charters under state law permitting them to act in this field and providing for enhanced regulatory oversight to ensure their reliability. In Vermont, such companies are overseen by DFR and include Community Financial Services Group, LLC, Securities Finance Trust Company, and Trust Company of Vermont. See <http://www.dfr.vermont.gov/banking/depository-trusts/directory-vermont-trust-companies>.

Vermont could move decisively to create an explicit framework for *identity trusts* and for *identity trust providers*. The providers could be either for profit or not for profit entities, who would register and receive appropriate oversight. By enacting a law that gives such explicit recognition to such arrangements and entities, Vermont would have the chance to become the jurisdiction of choice within the United States for locating these identity-protecting activities. We note that Virginia has some legislation in this area. Although it talks in terms of a trust framework, it aims at contractual creation, rather than an explicit fiduciary approach. See <https://law.lis.virginia.gov/vacode/title59.1/chapter50/>. A Vermont initiative could take this to an additional step by adopting a trust/fiduciary approach. The United Nations Commission on International Trade Law (UNCITRAL), also has useful models as part of its Electronic Commerce project.

A Vermont identity trust initiative could be beneficial on many levels. First of all, it aligns with Vermont’s ethos of providing protections to individuals in the face of commercial complexity and exploitation. The protection would be a direct benefit to Vermonters, but would also be available beyond Vermont to those lodging their personal information with a Vermont Identity Trust administered by a Vermont Identity Trust Provider. Nor is the benefit limited to the individuals; business and government would also benefit from a structure that reliably identified the individuals with whom they are interacting. This initiative would align with recent concerns expressed within the Assembly regarding data brokers, as evidenced by the [Data Broker Working Group](#) convened under Act 66 of 2017.

Furthermore, because such legal treatment would be reinforced by the physical location of the activity in Vermont, Vermont Identity Trusts and Providers would need to conduct the core of their business within Vermont. This would provide direct economic impact through their presence in the state. In addition, a set of taxes and registration and transaction fees could be assessed. Provided they were not excessive, these should give useful revenue to the state without sending the activity elsewhere. Because the number of transactions around an identity

system is likely to be high, each per-transaction fee could be quite small while still resulting in good overall revenues.

The risks appear relatively limited. The goal of these activities is to directly benefit individuals, who will have greater control over their personal information. Regulatory oversight would be necessary, but registration fees should be able to offset the cost to government. There could be failures and breaches, but those should be limited in scope if the technological and cryptographic architecture of the Trust is properly established and maintained.

We believe that this is an initiative that is worth significant attention by the Legislature. There are significant resources for its development available through OIX and other organizations, and the CLI would welcome the opportunity to put additional conversations on this in motion.

Additional Resources:

ABA Business Law Section, Cyberspace Law: Identity Management Legal Task Force,
<https://apps.americanbar.org/dch/committee.cfm?com=CL320041>

Open Identity Exchange (OIX) <http://www.openidentityexchange.org/>

Sellung, Rachele, Leszcz, Mike, Parks, Michelle & Dawes, Sue. "A Global Inventory of Trust Lists, Trust Schemes and Trust Frameworks," *OIX Whitepaper*, November 2017. <http://oixuk.org/wp-content/uploads/2017/11/OIX-White-Paper-A-Global-Inventory-of-Trust-Frameworks-and-Trust-Schemes-FINAL.pdf>

Smedinghoff, Thomas J. *Overview of the Legal Framework for Digital Identity Systems*, 2017
<http://apps.americanbar.org/webupload/commupload/CL320041/newsletterpubs/Legal-Framework-Governing-Identity-Systems.pdf>.

Uniform Law Commission Committee on Identity Management in Electronic Commerce,
<http://www.uniformlaws.org/Committee.aspx?title=Identity%20Management%20in%20Electronic%20Commerce>

United Nations Commission on International Trade Law (UNCITRAL). *Electronic Commerce*, 2017. http://www.uncitral.org/uncitral/en/uncitral_texts/electronic_commerce.html

Vermont Office of the Attorney General, *Data Broker Working Group*,
<http://ago.vermont.gov/focus/consumer-info/privacy-and-data-security1/data-broker-working-group.php>

C.2. Insurance Products

Many entities have been actively exploring applications of blockchain technology to the provision of insurance. Insurance contracts based on blockchain technology could provide a number of benefits for insurers and customers, including reduced administrative costs and more efficient claims processing in a relatively secure (technologically) environment.

Because much of the legal and regulatory framework for insurance products exists on the state rather than the federal level, new innovative legislative and regulatory approaches by Vermont could offer significant opportunities to attract blockchain-technology-based insurance providers. In any event, blockchain technology in the insurance area should provide advantages to all Vermonters who benefit from insurance.

Blockchain technology can be used in the insurance environment in many ways. One area that is garnering much attention involves the potential formation of insurance pools of capital that would then function to pay claims of customers on an automated basis using so-called “smart contracts”. For example, customers wishing to obtain insurance with respect to late deliveries of airline luggage, cancelled or delayed airline flights, and natural disasters, could obtain such insurance using blockchain technology. Premiums for such insurance would be paid through digital currency into an insurance pool maintained by an insurance company.

The insurance company would pay for losses based on information it receives as to events triggering the loss from a so-called “blockchain oracle.” This “oracle” would be a source trusted to verify the entitlement of person making a claim for an insurance loss, providing confirmation that the person is actually entitled to such loss. So, for example, in the case of a late flight, the oracle might be some type of airline-based scheduling system that verifies on time, late and cancelled airline flights. In the case of a national disaster, it could be a federal or state agency verifying the existence of a flood in a particular location. Almost any device which can report on its status through the “internet of things” is a potential oracle about its own status.

Insurance of this kind, functioning largely automatically, with premiums paid and awards made through the use of blockchain technology, is sometimes called “parametric insurance.” See <https://www.lexology.com/library/detail.aspx?g=1a980dc3-27b1-461b-be59-cec9ff079bf1> The development of this business sector would be accelerated by the availability of an innovative regulatory and legal environment that licensed entities to provide such insurance.

Blockchain technology could also be of particular interest to captive insurance companies. Because these companies are owned and administered by the enterprises insured by them, they may offer additional flexibility to adopt creative solutions using proprietary blockchain technology. Intra-company loss verification can require validation much as described above.

There may be additional opportunities to adopt a legal structure facilitating blockchain transactions in a captive environment.

Another example of a type of insurance product that has recently benefited from blockchain technology is a “tontine” insurance approach. Basically, tontines work on a pure risk sharing basis with no central guarantor. The amounts people contribute to the tontine are invested 100% to provide the mutual benefit, rather than a lower percentage typically invested in the case of other insurance products such as annuities. Tontine investment benefits are split among living members of the original group making the investment. As members die off, the remaining smaller group of investors continues to derive benefits from the insurance products, which therefore increase over time, in contrast to the typical annuity contract. The tontine was popular in the United States during the 19th Century, but fell out of use in the 20th. Because of blockchain technology, new applications for tontines are being developed in Europe. These could be linked to automatic claims settlement for further efficiency. A legal and regulatory structure favorable to tontines under state law could foster a revival in the United States.

There are myriad other insurance products being developed in anticipation of benefits through the use of blockchain technology. An innovative legislative and regulatory structure that embraced, enabled, and appropriately governed these products could prove very beneficial to Vermont. If the Legislature wished to explore this structure further, the CLI can help obtain input from people developing these types of products that would help guide drafting statutory proposals for consideration.

Additional Resources:

Verde, Tom. “When Others Die, Tontine Investors Win,” *New York Times*, March 24, 2017. https://www.nytimes.com/2017/03/24/business/retirement/tontines-retirement-annuity.html?_r=0

Steptoe & Johnson LLP. “New Models of Insurance: Parametric Insurance,” *Steptoe Blockchain Blog, Lexology*, May 9 2017. <https://www.lexology.com/library/detail.aspx?g=1a980dc3-27b1-461b-be59-cec9ff079bf1>

C.3. e-Banking/FinTech Charters

In 2016, the Office of the Controller of the Currency (OCC) explored whether it should use its bank-chartering authority to create special national bank charters for financial technology companies. The goals were to open up the banking system to innovation and also to bring that innovation into the system of regulatory oversight at the federal level. See Report at

<https://www.occ.gov/topics/responsible-innovation/comments/special-purpose-national-bank-charters-for-fintech.pdf> These proposals created considerable controversy, including a law suit which argued that the OCC does not have the authority to grant special charters and that any such action could lead to weaker consumer protection. The lawsuit was brought by the Conference of State Bank Supervisors, the nationwide organization of banking regulators, of which Vermont is a member. State banking regulators, including Vermont, are party to a 1998 Nationwide Cooperative Agreement, which preserves the ability of states to enforce their laws against out-of-state banks. However, this agreement cannot apply to federally chartered banks. Hence, OCC's attempt to create a national fintech bank charter could circumvent certain state laws (including consumer protection laws). Implementation of the OCC proposal is currently suspended, although the OCC is considering applications by FinTech based companies to become chartered as full purpose national banks.

This suspension of federal efforts may create a state-level opportunity that Vermont could try to grasp. A state-level financial technology banking charter could be developed drawing on the OCC's work. Adoption by Vermont could both enable existing institutions to move in this innovative direction and encourage new entrants. This would benefit Vermont banking customers, and could also potentially open our banks to new customers resident in other states and countries. The old jurisdictional constraints of physical presence in a state are evaporating. A Vermont chartered institution could engage with customers from other states as well, although the degree to which such another state's laws might apply to such transactions is not fully resolved. <https://www.thompsoncoburn.com/insights/blogs/bank-check/post/2017-01-20/fintech-internet-banking-across-state-borders-triggers-compliance-challenges-for-state-banks>

If the Legislature were interested in following up on such an initiative, it should do so in close consultation with the Commissioner of DFR and with input from our state and national financial sectors to ensure that it fits smoothly into the framework of Vermont financial regulation and that it offers opportunities to our existing banks as well as to new entrants. Any such initiative would require significant additional analysis by DFR.

Additional Resources:

Conference of State Bank Supervisors. "Financial Technology," *CSBS*. <https://www.csbs.org/policy/fintech>

Conference of State Bank Supervisors. "CSBS Files Complaint Against Comptroller of the Currency," *CSBS*, April 26, 2017. <https://www.csbs.org/csbs-files-complaint-against-comptroller-currency>

Office of the Controller of the Currency. *Exploring Special Purpose National Bank Charters for Fintech Companies*, December, 2016. <https://www.occ.gov/topics/responsible-innovation/comments/special-purpose-national-bank-charters-for-fintech.pdf>

Omer, Greg. "Fintech: Internet banking across state borders triggers compliance challenges for state banks," *Thompson Coburn LLP Blog*, January 20, 2017.

<https://www.thompsoncoburn.com/insights/blogs/bank-check/post/2017-01-20/fintech-internet-banking-across-state-borders-triggers-compliance-challenges-for-state-banks>

C.4. Digital Property Transfers and Registries

Real property transfers, records and ownership have been identified as prime targets for managing through a distributed ledger system. The use of blockchain technology for these purposes should allow real estate transactions to take place in a more secure and efficient, and less costly environment than currently exists. Such systems are in development in several international jurisdictions. In the US, a number of companies are engaged in developing the filed.

Transactions using this technology would likely involve the use of so-called "smart contracts" to automate and reduce the cost of transfers of real property. As envisioned by certain blockchain real property platforms, a real property purchaser would identify a property for sale, execute a contract for the purchase of such property and deliver a deposit in connection with that purchase to be held by a third-party escrow company. Verification of title would then be made through a title insurance company or some other automated mechanism. If necessary, a home inspection could also be facilitated using the blockchain system. Upon completion of those steps, the would-be purchaser would deliver the remainder of the purchase price, and the seller would deliver a deed to be recorded electronically against the receipt of the required purchase funds.

Adopting legal and regulatory changes to facilitate and encourage use of this technology would provide two principal benefits to Vermont. First, at least one company actively involved in the development of a trading platform for real property using blockchain technology has indicated an interest in and willingness to devote resources and potentially investments in Vermont to use Vermont as a prototype state for implementation of its real property trading platform. Second, implementation of these of changes should benefit all Vermonters by allowing lower costs and more efficient means of facilitating transfers of real estate through the use of blockchain technology to allow them to occur in an efficient, lower costs, and secure manner. From the standpoint of state and local government, the costs associated with processing and maintaining real estate records could be significantly reduced.

Because a number of these steps require transactions to be completed based on digital property records and recording, some steps may be necessary in order to facilitate these transactions. Vermont has already adopted the Uniform Electronic Transactions Act (“UETA”). That statute applies to all electronic signatures and records related to any transaction, subject to limited exceptions. Real estate records and signatures are not identified as an excluded class under UETA, and we are not aware of why it would not apply to real estate transactions, including the execution and recording of real property deeds. However, to our knowledge, no Vermont city or town is currently accepting and recording deeds in digital form. Assuming that a city or town would accept a deed in electronic form, a next step might be to attempt to obtain title insurance for such transfer. It also may be appropriate to obtain a legislative confirmation that UETA does apply to real estate documents and transfers.

In this regard, we also note that National Conference of Commissioners on Uniform State Laws has drafted a Uniform Real Property Electronic Recording Act which has now been adopted by a majority of other states. This act specifically permits recording of real estate transfer documents such as deeds in electronic form. However, as stated above, passage of that law may not be necessary given the existing provisions of UETA.

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Deloitte. *Blockchain in commercial real estate: The future is here!*, 2017.

<https://www2.deloitte.com/content/dam/Deloitte/us/Documents/financial-services/us-fsi-rec-blockchain-in-commercial-real-estate.pdf>

International Blockchain Real Estate Association (IBREA) <http://www.ibtcrea.org/>

Shin, Laura. “The First Government To Secure Land Titles On The Bitcoin Blockchain Expands Project,” *Forbes*, February 7, 2017. <https://www.forbes.com/sites/laurashin/2017/02/07/the-first-government-to-secure-land-titles-on-the-bitcoin-blockchain-expands-project/#6ec324cf4dcd>

C.5. Safe Harbors for Financial Trustees Using FinTech Approaches

The adoption of FinTech approaches can raise concerns for actors operating within fiduciary frameworks. These range from trustees in classic trusts with individual beneficiaries, through trust companies more generally, and on to trustees in sophisticated financial transactions, such as corporate and governmental debt offerings. Providing legislative and clarity on standards that recognize and permit responsible use of FinTech approaches by such trustees would both

help existing Vermont fiduciaries participate in innovative investments and potentially lure additional business in the area to Vermont.

One could imagine, for instance, a simple declaration in an appropriate statute such as “the investment of funds held by a fiduciary in cryptocurrencies or other innovative instruments involving financial technology, will not be in themselves a violation of the duties of the fiduciary, provided that they otherwise meet the standards of care and prudence generally applicable to investment by such fiduciary”. Such a declaration would not immunize behavior that falls short of existing standards, but would provide a measure of comfort that innovative investments would not be in themselves actionable.

If pursuing this alternative were of interest to the Legislature, it would be possible to connect with fiduciaries from a wide range of contexts, along with Vermont and national regulators, to assess what would help provide surety and security to fiduciaries and beneficiaries alike.

C.6. Autonomous Agent Corporations/LLCs¹

An autonomous agent is as software program that controls things in the real world. While we generally think of these in terms of physical agencies, like “self-driving cars,” software “bots” are quite common in the financial world, with machine intelligence driving trading programs with little if any human intervention. As the July, 6 2017 Financial Times noted:

“Robots are moving on to the trading floors of investment banks. UBS this week showcased how two artificial intelligence systems can help traders perform better at the Swiss bank’s futuristic new City of London Office.”

<https://www.ft.com/content/da7e3ec2-6246-11e7-8814-0ac7eb84e5f1>

Because these things are new, they need a new legal framework that will encourage and regulate their activity.

Vermont could be a first mover in the United States in the creation of a legal structure for governing autonomous agents in a manner that protects its own interests while generating new opportunities and revenue. We could create a framework for recognizing autonomous agent corporations via a sub-chapter of Vermont corporate code. As with a blockchain LLC, such a law would create a safe harbor against liability for the directors, officers and owners of companies whose principal business purpose is to deploy an autonomous agent. This legal solution should address the following five points:

¹ This proposal draws on material developed in connection with the Vermont Legithon session in 2015. See <https://www.vermontlaw.edu/sites/default/files/Assets/events/Legithon/ROBOTS.pdf>.

- i. Unique label. Provide each autonomous agent with a legally useful label distinguishing it from other instances of its type.
- ii. Autonomy. Recognize that autonomous agents are legally capable of independent decision-making.
- iii. Supervision and responsibility. Define the degree to which an autonomous agent is subject to human supervision and the responsibility of the supervisor.
- iv. Regulation. Define the role that the government takes and to what end.
- v. Economic and social effects. Determine and address the external economic and social effects.

Such a development would have both pros and cons.

- Pro- By providing an established and predictable regulatory environment Vermont would remove some of the uncertainty for companies wishing to deploy autonomous agents in new markets and environments. This, in turn, could provide Vermont with a potentially substantial revenue stream from licensing fees, franchise fees, and other business-related taxes.
- Pro- While the loss of traditional jobs to autonomous agents may be inevitable, advance preparation would put Vermont in a position to mitigate some of the social and economic damage. Revenues generated could be directed to services for those adversely affected by a transition to a more autonomous economy.
- Pro- A law that accommodates and eases the adoption of autonomous agent technology which could have numerous benefits to public safety, access to goods and services, and overall quality of life for many people.
- Pro- A law that establishes reasonable care in the supervision of autonomous agents could generate its own set of employment opportunities. Pro- Safe harbor regulations could help to drive further innovation.
- Con- For mostly unrelated reasons, the application of “corporate personhood” may be viewed as intensely controversial in many quarters.
- Con- Because of the general “creepiness factor” connected with non-human agents making decisions in the real world, this topic may elicit all kinds of negative responses. Choice of language should be particularly sensitive to this.
- Con- Because we are dealing with new technology being used in new ways, the risk of unintended consequences may be particularly great. This creates a need for intensive and continuous oversight. On the other hand, taking a reactive stance may be even more perilous.

- Con- How autonomous agents will be insured hasn't yet been determined. Incorrectly predicting how insurance will be administered could produce a new set of obstacles. On the other hand, being ahead of the curve would allow Vermont to steer the conversation in ways that are advantageous.
- Con- A law that protects the interests of the "owners" of autonomous agents may be organically at odds with the ultimate interests of those whose jobs are replaced. On the other hand, a legal framework providing safe harbor to companies could facilitate the emergence of locally owned operators of autonomous agents.

The creation of this approach could be made through changes to Title 11A of the Vermont Statutes. Possible language that could accomplish this is set out below. The language provided is purely for illustrative purposes and any actual legislation would require significant additional research and consultation with industry experts, and should be drafted in close consultation with DFR and other appropriate Agencies.

Chapter 22 Autonomous Agent Corporations

§22.01 For the purposes of this title, an "autonomous agent" is an artificial decision-capable agent operating without the interference of a human being.

§22.02 A Vermont corporation may be established for the purposes of providing legal recognition of an autonomous agent. Such a corporation will be known as an "autonomous agent corporation." Each autonomous agent corporation may cover the activities of only one autonomous agent.

§22.03 The standard of care necessary to rely on the limitation of liability for officers, directors and shareholders of a corporation provided for in §6.22 and §8.30(d) of this title will be met by a corporation which does the following: a) Exercises reasonable care in the creation or procurement of the hardware and software embodying the autonomous agent. b) Exercises reasonable care in the deployment and supervision of the autonomous agent. c) Maintains, and when necessary exercises, the ability to turn off the autonomous agent. d) Gathers and maintains reasonable records of the operation and maintenance of the autonomous agent.

§22.04 Each autonomous agent will have a unique identifier which will be included in the name of its autonomous agent corporation and shall be registered with a Legal Entity Identifier process.

§22.05 The Secretary of State's office shall collect a fee of \$200 per year from each autonomous agent corporation in addition to the normal franchise and business taxes

with respect to each autonomous agent. B. Regulatory Structure: 1. The Department of Financial Regulation shall develop and recommend an overall regulatory structure for the activities of autonomous agency corporations and of autonomous agents in the State of Vermont generally and will report on its findings to the General Assembly by no later than _____. 2. In the development of this structure, the Department of Financial Regulation shall coordinate with other departments with jurisdiction over particular activities such as the Department of Transportation for autonomous vehicles.

To help promote economic development and at the same time mitigate the impact of the autonomous agents DFR should work with the ACCD Department of Economic Development, the Secretary of State, and the Department of Labor to study the anticipated positive and negative economic and social impacts of autonomous agents for Vermont, giving the Legislature an informed basis for going forward.

The robots are coming. There's no getting out of this. But getting out in front of this will be immensely beneficial. Providing a framework for recognizing and regulating autonomous agents is a necessity. Being a leader on this could be an opportunity.

Additional Resources:

Arnold, Martin & Noonan, Laura. "Robots enter investment banks' trading floors," *Financial Times*, July 6, 2017 <https://www.ft.com/content/da7e3ec2-6246-11e7-8814-0ac7eb84e5f1>

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D. ADOPTION OF BLOCKCHAIN, CRYPTOCURRENCY AND FINTECH IN VERMONT

D.1. Government Processes and Functions. The 2016 report to the Legislature on *Blockchain Technology: Opportunities and Risks* concluded that there was not yet any clear case for adopting the technology in the operations of Vermont state government. It stated:

At present blockchain technology adds little in terms of public recordkeeping. The records kept by the State are presumed reliable and accurate in terms of content. Moreover, effective

records management policies and procedures by agencies should address the authenticity of records. The need to preserve copies of electronic records for long periods of time is already essential to state business and strategies and tools are in place to address these needs. Because blockchain technology would likely result only in the registration of hashes, the state would still need to preserve original documents long-term. In light of the very limited possible benefits and the likely significant costs for either entering into a private or public blockchain or setting up a state-operated blockchain, at this time, blockchain technology would be of limited value in conducting state business.

Although we are only two years on from that conclusion, it may be worth revisiting it. Technology has improved, and distributed ledger techniques can enable functionalities beyond the simple preservation of records. Discussion of possible public uses has grown, as indicated by the existence of forums such as the Government Blockchain Association (<https://governmentblockchain.org/>) and its Vermont Chapter (<https://governmentblockchain.org/>). The linked topics of voter registration and election integrity, for instance, have emerged as critical concerns that could potentially be addressed through blockchain techniques.

While governmental use falls largely outside the assigned scope of this report, the Legislature could consider a commissioning an additional study to provide guidance on whether the time is ripe to incorporate distributed ledger techniques into at least some aspects of government. Such a study would anticipate possible action in the 2019 legislative session.

Additional Resources:

White, Mark, Killmeyer, Jason & Chew, Bruce. "Will blockchain transform the public sector? Blockchain basics for Government," *Deloitte Insights*, September 11, 2017.

<https://dupress.deloitte.com/dup-us-en/industry/public-sector/understanding-basics-of-blockchain-in-government.html>

D.2. Private Sector Adoption

In all events, it appears likely that cryptocurrency adoption and use will expand globally over the next few years, and Vermont will not be an exception. While Vermont's regulators have already taken steps to protect Vermonters in the context of general use, the Legislature could encourage further inquiry and action aimed at both facilitating adoption of cryptocurrencies in appropriate contexts and instituting proper safeguards. For instance, the voluntary choice by Vermont vendors to accept cryptocurrency has arguably lagged due to conservatism and a lack of information. Vermont's economic development and banking teams could undertake a "how to" project that could provide trusted, balanced information on what acceptance of cryptocurrency would involve for a Vermont business.

The Legislature could, as part of any review of financial technology and distributed ledger generally, consult with:

- Traditional Banks, brokers, other financial industry players
- Traditional insurance providers, including our captive sector
- Retail and service providers
- Cryptocurrency providers and proponents

Based on the input of these and other economic stakeholders, the Legislature could seek to remove unnecessary barriers to adoption while preserving adequate regulatory oversight. Even without further action, having a governmental forum to highlight opportunities and cautions would be useful. In addition to committee hearings, there could be a “Financial Technology Awareness Summit” convened at the State House to allow the various Vermont-based players and constituencies a chance to interact productively.

Additional Resources

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<https://www.secureworks.com/resources/wp-cryptocurrency-adoption-best-practices>

D.3. Educational Opportunities

As blockchain and other financial technologies proliferate, Vermont’s educational institutions should be sure that these subjects are taught in programs on finance, law, computer science, economics and government. The Legislature could support this directly or indirectly. Direct support could include budgetary allocations in its education spending. Indirect support could include a “FinTech and Education Day” at the Legislature, using the power of the “bully pulpit” to convene and educate the educators. This could be held in coordination with a broader Awareness Summit.

Additional Resources:

Dorning, Melinda. “Why ‘Blockchain’ is Becoming the Rage at U.S. Business Schools,” *Business Education Week*, November 16, 2017. <https://bew.acbsp.org/tag/fintech/>

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