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Project factsheet information

Project title	Legalese
Grant recipient	Legalese Pte Ltd 791 Yishun Avenue 2 #04-1449 Singapore 760791 +65 9101 2478 http://legalese.com
Dates covered by this report	24 – 08 – 2016 / 31 – 10 – 2017
Report submission date	15 – 15 – 2017
Country where project was implemented	Singapore
Project leader name	Wong Meng Weng mengwong@legalese.com
Team members (list)	Alexis Natalie Chun Jie Shi (Zeng Jieshi) alexis@legalese.com Dustin Wehr dustin.wehr@gmail.com Job Chong jobchong@gmail.com Ong Chiah Li Chiahli.ong@gmail.com Vikram Verma vi@computational.law Virgil Griffith i@virgil.gr Anuj Gupta mail@anuj.me
Partner organizations	Besides the team members listed above, many other contributors to the open-source project (including computer scientists, lawyers, lawyer-turned-programmers, programmers-turned-lawyers, law students, linguists, and programmers from places like Singapore, Australia, Canada, America, India, Germany)
Total budget approved	SGD 30,747.00
Project summary	Legalese is a deeptech legal startup serving SEA entrepreneurs who do not have the access to fundraising documents needed to raise their first money. Legalese has 2 parallel arms: the product arm that builds the application that end-users interact with to generate the fundraising documents, and the research arm that is creating and implementing a domain-specific language for law. Eventually, the two will dovetail.

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Background and Justification

LEGAL SOLUTIONS: THE PROBLEM OF CREDENCE GOODS

Today, if like most people you haven't been to law school but find yourself needing legal solutions, you'll likely turn to a lawyer. Being human, that lawyer will be error-prone, have imperfect recall, have unreliable performance replicability, and charge for input (not output) by the hour. And because consumers do not have the expertise to assess the solutions they receive, then the solutions are taken on *faith*; talismanic because they've been blessed by a lawyer. Legal solutions today are what economists call *credence goods*: goods which consumers cannot at the outset, ascertain the quality or utility of.

This hits startups and young entrepreneurs especially hard. The first-time entrepreneurs realize they need legal advice / solutions is when they're trying to secure their first investors; when someone says, "I like your idea, send me the paperwork". But fundraising paperwork are not the ad-hoc NDA-type agreements that are (relatively) easily hacked together. Instead, they are complex document workflows that consist of contracts (like the Investment Agreement or Founders' Agreement) but also quasi-legal and corporate documentation (such as shareholders' resolutions, directors' resolutions, pre-emptive waivers, regulatory notices and filings) that are needed to *effect* the deal. To add to that confusion, these all have to executed in the *correct order* and be capable of being correctly amended and ratified as more investors come in or when deal terms change.

Existing solutions for first-time entrepreneurs caught in the situation described above are rather blunt. Either these cash-strapped fundraising entrepreneurs pay through the nose for professional legal advice – a low-volume, high margin, closed and proprietary system where a human lawyer, billing by the hour, replicates past performance by hand, and works off precedents; or they use at their own risk, free legal templates that they find on the web, hopefully after having picked the correct ones and then thereafter executing them in the right order. In the 2016 world where cars already drive themselves, it's rather barbaric for the legal sphere's use of technology to be largely limited to the realm of word processing and document storage. The computer is thus almost insultingly used as a glorified typewriter, but not with much else. These incumbents use technology only to help with the typing, but not with the *thinking.*

Entrepreneurs in South and Southeast Asia who have found potential investors suffer even more friction because the online templates that most other entrepreneurs rely on are primarily in English, and these web-based solutions are today mostly only available for American jurisdictions. While some law firms are beginning to produce legal templates aimed for the Singapore jurisdiction[1], there remains much unmet demand for self-help legal solutions outside the small bubble of English-speaking Singapore business. We believe that this unmet demand is one factor in limiting entrepreneurship and hence economic progress in Asia.

See:

- https://www.techinasia.com/talk/common-legal-mistakes-entrepreneurs-make
- http://www.out-law.com/en/articles/2013/november/english-language-contract-deemed-void-by-indonesian-court/
- https://www.laurencesimons.com/articles/contract-drafting-and-negotiation-in-multiple-languages--43095821148

The Language Barrier in Access to Finance

In the FinTech sector, much has been said about improving access to finance for the unbanked and underbanked. In the LegalTech sector, the same could be said about improving access to contracts and corporate forms, for "unlawyered" and "underlawyered" entrepreneurs and small business owners in emerging

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[1] Law firms' legal templates aimed for the Singapore jurisdiction https://simmondsstewart.com/templates/

economies. By some estimates, about 80% of people in the US who need legal services *do not* go to a lawyer. This "access to finance & legal" issue is almost certainly worse in Asia.

Many entrepreneurs seek to participate in the global economy, seeking access to markets and access to capital, but are often disadvantaged by their lack of English skills. This is true in trade commerce generally, but the problem is particularly acute in the field of startup and SME financing, where important legal agreements, and the education around them, are often available only in English.

In Developed Economies

Developed economies, particularly the US, enjoy three advantages:

1. Lawyers in the US operate in a competitive market, and charge startups reasonable rates for corporate finance transactions. In Silicon Valley, many law firms will defer fees in expectation of a startup's future business.
2. Many "fill in the blanks" templates for legal agreements are freely available for entrepreneurs to download, customize, and execute. These templates are typically aimed at Delaware and Nevada corporations.
3. These agreements are available in English, and are therefore directly accessible to their intended audiences without the need for translation.

In Emerging Middle Class Economies

Developing economies do not enjoy these advantages.

In South and Southeast Asia, trained corporate lawyers often have experience only with big-company work – mergers & acquisitions or oil & gas transactions – and are unfamiliar with the peculiarities of startup financing. They tend to charge big-company fees, putting access to professional legal services out of reach of the typical EMC entrepreneur.

So entrepreneurs often turn to the Internet, downloading English-language templates and trying to adapt them for their own use – an approach fraught with danger. Many do not know enough English to work with highly technical legal language. Even if they do, they realize they lack the legal expertise required to translate a Delaware template for, say, Malaysian law. Often, they give up and just do their best, hoping that the handshake will matter more than the paperwork, optimistic that things won't go wrong.

Inadequate Access to Legal Agreements

As a result, in developing economies, founders and investors often sign English-language agreements cobbled together without the aid of a competent lawyer. The content of such agreements is often dangerously incoherent. As the parties do not speak English fluently, the precise contents of the agreements may be a mystery to all sides. This is a recipe for frustrated expectations and eventual litigation. A new business encumbered by developmental disadvantages during its youth will may disqualify itself from access to future financing at growth stage, or even from an eventual M&A.

This is a systemic barrier to economic advancement which we propose to solve using technology. We treat the insufficiency of self-help legal services as a problem in Internet infrastructure.

Project Narrative

PROBLEM STATEMENT FROM LEGALESE'S ORIGINAL GRANT APPLICATION

> Emerging-middle-class entrepreneurs in South & Southeast Asia who have found potential investors still suffer friction in actually closing the deal because lawyers are expensive, because templates for investment agreements are primarily in English, and because web-based solutions are today only available for American jurisdictions. This is a systemic barrier to economic advancement which we propose to solve using technology.

LEGALESE'S PROPOSED SOLUTION

The answer is not more lawyers; the answer is free software.

Today's foremost technology investor Marc Andreessen said, "*software is eating the world*". The Legalese premise: software is eating law.

But when Andreessen says "eats" he has something very specific in mind: the "Turing'ification"[2] of an industry is something that only a computer scientist can properly understand. In Twitter conversation with us, in 2014, he mentioned Judicata and LegalZoom – then said, "we're looking for a good one." What does that mean? Find-a-lawyer marketplaces, download-a-template sites, and e-discovery search engines may be nibbling at the edges of the traditional legal profession, but they aren't eating it, not the way Lyft/Uber are eating the taxi industry, or the way Otto seeks to eat long-distance trucking, or the way Netflix is eating TV.

Today's document automation software is mostly a more full-featured version of Microsoft Word. Legalese has roots in document automation, but sets its sights higher and deeper: on deep-tech, computer-science-driven software that will transform the legal industry (not just the legal profession), serving not just lawyers but their clients as well.

Our insight is that law today is where software was in the late 1960s: about to jump from hand-written assembly and simple macros to compiled languages. Of all the white-collar categories cited above, the field of legal drafting has the most in common with software development: they both draw from existing precedents/libraries to write and configure code for clients requiring specific objectives. Howard Darmstadter's (2010) Precision's Counterfeit: The Failures of Complex Documents, and Some Suggested Remedies, published in the American Bar Association's Business Lawyer journal in 2010, reads like both a clarion call – "there's got to be a better way!" – and a grope in the dark – "one possible idea: don't repeat yourself" – by someone who, being a lawyer not a programmer, has no exposure to the disciplines and possibilities of software engineering and language design. Indeed, he talks about debugging contracts as programs; he talks about testing; he talks about using mathematical notation, even flowcharts, to improve clarity. But as a lawyer he doesn't know where to go next. Lawyers don't get CLE credits for reading Steve McConnell[3]. Lawyers haven't heard of formal verification[4] or BPMN[5], whose history has much to teach. Yet contracts are, effectively, business process specifications. But they skip the high-level modelling and go straight to writing a low-level executable by hand … using a collaboration methodology that could only be described as pair programming by correspondence, the way chess used to be played[6] during the Cold War.

The next step is obvious to a computer scientist: a domain-specific programming language (DSL) for legal, designed to capture legal semantics and logic; a deep-tech computer science approach to law. The DSL does for the modal calculus (Agotnes, Broersen, & Elgesem, 2012) what functional languages do for the lambda

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[2] Turing'ification http://kk.org/thetechnium/turingd/
[3] Steve McConnell https://www.amazon.com/Steve-McConnell/e/B000APETRK/
[4] Formal verification https://en.wikipedia.org/wiki/Formal_verification
[5] Business Process Model and Notation (BPMN) https://en.wikipedia.org/wiki/Business_Process_Model_and_Notation
[6] World Correspondence Chess Championship https://en.wikipedia.org/wiki/World_Correspondence_Chess_Championship

calculus (Landin, 1965). The idea of a DSL is not new: companies like Adobe, Intuit, Autodesk, Cadence, category-owners of their respective fields, all started with their own domain specific languages. Accompanied by static analyzers capable of formal verification, a DSL will enable us to prove, to the extent mathematically possible, that the contracts written in the language are correct, consistent, and compliant with legislative constraints.

A DSL also means that all documents will have a common denominator for entire suites of future functionality. The history of computer science informs the future of legal: we can translate entire families of concepts, such as compilation, dependency management, static analysis, unit & integration testing, and even agile development and open source software communities of practice.

The battery of tools which computer scientists and programmers currently have at their disposal can be applied to law. Legalese asserts that what tomorrow's lawyers do (Susskind, 2017) will look a lot like what today's programmers do: drawing on open source libraries, they will configure code for clients that compiles to readable contracts – maybe English, maybe Chinese, maybe Ethereum. From that future, we will look back on today's lawyers, drafting agreements in Microsoft Word and checking references by hand, as being as quaint as calligraphy and hand embroidery.

OBJECTIVES SET OUT IN LEGALESE'S GRANT APPLICATION

At the application level

This solution enables an existing low-end market to obtain legal services which are currently priced out of their reach. By reducing the friction of performing a startup financing, the solution improves access to capital in emerging markets and thus facilitates economic development.

Specifically, the project will enable Asian entrepreneurs and investors to complete financing transactions of any amount without having to manually adapt American precedents, and without being forced to pay lawyers for the paperwork. They will be able to:

· access a multilingual library of contract templates,

· express to the system the desired outcome of a given transaction,

· automatically generate a suitable set of agreements suitable for execution (between the parties) and filing (with the state, if necessary),

· understand the implications of each proposed action.

The system manages the sequence of signatures. Wherever possible, it interfaces, using APIs, with state registries for filing purposes.

At the social level

The social practices common to software development will begin to influence the delivery of law. Instead of sending Word documents back and forth with "track changes", the community may one day send pull requests on GitHub. Instead of relying on an experienced lawyer for advice, an end-user may consult the legal equivalent of StackExchange to hear opinions from a community of peers. Citizens may get more involved in democratic processes, contributing to the legislative process not just by protesting, but by demonstrating an undesirable edge case through a software-supported scenario visualization, and offering a proposed patch.

Some of the social implications of our technology are explored in the UCLA Law Review article *Four Futures of Legal Automation* (Frank Pasquale & Glyn Cashwell, 2015).

At the technology level

The compiler for the language will be able to output to multiple natural languages – English, Bahasa Indonesia, Chinese, Hindi, Tamil. The compiler will also target existing Blockchain type systems like Ethereum and Corda.

Lateral applications

Investment agreements are just the first of many possible application areas. Formal "smart" contracts and regulations can apply to many other fields, such as employment agreements, service contracts, and maritime contracts.

ORGANIZATIONS

National Research Foundation of Singapore

Relevant Legalese objective: Technology, Social, Application, Lateral

The National Research Foundation (NRF) is a department within the Prime Minister's Office. The NRF sets the national direction for research and development (R&D) by developing policies, plans and strategies for research, innovation and enterprise. It also funds strategic initiatives and builds up R&D capabilities by nurturing research talent.

- Alexis piqued the interest of the NRF after its officers attended a pitch she had given. From that first connection, she's been working with NRF on Legalese's proposals on the computational legal front, involving R&D into smart contracts, smart statutes, as well as the possibility of setting up a centre for computational legal in Singapore[7].

Singapore Management University (School of Law, and School of Information Systems)

Relevant Legalese objective: Technology, Social, Application, Lateral

- Alexis reached out to Goh Yihan (a prominent legal academic who was just made the dean of the law school) about the idea of co-innovation and collaboration
- This is gradually taking shape in the form of a proposal to build a Centre of Computational Legal, potentially with the backing of the Ministry of Law and the NRF

Berkman Klein Center for Internet & Society, Harvard University

Relevant Legalese objective: Technology, Social, Application, Lateral

- Wong Meng Weng, Fellow (2016 – 2017)

  - Members of the Legalese team spent time in Cambridge, MA capitalising on the close proximity to the Harvard and MIT talent pool. With that accelerating the process of DSL

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[7] Legalese R&D - Smart Contracts Proposal
https://docs.google.com/document/d/1tKIFQEiDLG6wMp44mHWwFW7qQqNAPkCamLNjzbzahN8/edit
   Legalese R&D - Smart Statutes Proposal
https://docs.google.com/document/d/1bQfSM_8VH0cXRlNSpqNCgPoVe4GwFytTWMEmbQx2chU/edit
   Legalese – Proposal on Research Programme in Computational Law
https://docs.google.com/document/d/1axsJKzkO2UF43SJVajgvzv8cpo48RG4sPMUDNhl6CBc/edit

design, Legalese has produced an initial design BNF and compiler for the L4 language that is compatible with the CSL language, as defined in Tom Hvitved's 2013 PhD thesis. Legalese has drafted several versions of a simple demonstration contract in various versions of that initial language.

- Meng guest-lectured a class at Harvard Law School (Law without Borders: Legal Data-driven Platforms[8])

Stanford Centre for Legal Informatics (CodeX), Stanford University

Relevant Legalese objective: Social, Technology, Application, Lateral

- Wong Meng Weng, Fellow (Fall 2017 – 2018)
- Meng is currently a fellow at Stanford's CodeX Centre, with the aim of working on and leading the computable contracts initiative
- This is a multi-institution collaboration. As a prelude to this, three members of the Legalese team visited Oliver Goodenough at Vermont Law School and discussed the potential for our work to increase access to justice for disadvantaged communities.

Singapore Academy of Law (SAL)

Relevant Legalese objective: Social, Application, Lateral

On 14 Dec 2016, Legalese was invited by the SAL to participate in a focus group on legal-tech and the future of law. At the session, Alexis's advocated that the legal profession ought to be considered separately from the legal industry, and with that in mind, the SAL (headed by the Chief Justice) ought to serve the consumers of legal industry, rather than simply the profession. The distinction is important for disruptive innovations like Legalese as we are not looking to serve the incumbent law firms via a service, time-for money model, but rather, bypass them altogether and productize legal services direct to consumer. That culminated in the Legal Technology Vision[9] which was endorsed by Chief Justice Menon at the opening of the 2017 legal year. We were mentioned under the Smart Contracts section. Conversations with SAL, particularly in the realm of legislation and industry engagement, are still ongoing.

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[8] Law without Borders: Legal Data-driven Platforms https://cyber.harvard.edu/events/2016/12/Algorithms
[9] Legal Technology Vision https://www.lawnet.sg/lawnet/web/lawnet/home

When the co-founders of *Legalese* attended the 2017 Legal Geek Conference in London, the SAL recognised that we were the only Singaporean LegalTech startup that was at the event. The SAL delegates and the Legalese founders engaged in further discussions about industry-alliance, market applications and go-to-market strategies, as well as the other efforts that Legalese was engaged in.

GeneralStandards.co

Relevant Legalese objective: Social, Application, Lateral

In January 2017, we had a discussion with Campbell Unsworth of General Standards. They are startup lawyers doing startup documents and advisory in a bulk-based business model. Campbell expressed interest in porting their templates into the Legalese system once v2 is up and ready. We agreed to keep in touch on this.

Mattereum community / Internet of Agreements

Relevant Legalese objective: Application, Technology

Mattereum is the first Internet of Agreements infrastructure project to manage legal rights over physical property, intellectual property, and eventually even real estate, on the blockchain. Meng first engaged Mattereum's Vinay Gupta and Rob Knight in June 2017, and subsequently was asked to give a talk at the inaugural Internet of Agreements conference in London later in October the same year. The close alignment and vision between the two communities has injected new blood, insight, and energy in the Legalese community. There are ongoing discussions about cross-fertilization and collaboration opportunities between our communities.

Chalmers University

Relevant Legalese objective: Technology, Application

Legalese attended the Ph.D. defense of John Camilleri on the areas of language technology and formal methods, a subject closely aligned with our research interests. John was also supervised by Gerardo Schneider and Koen Claessen, whose work and papers Legalese had already been previously introduced to. As such, the get-together in Gothenburg was fruitful in understanding the undocumented friction that arose in these research areas, the commercialization attempts that had been made, and other closely aligned initiatives in the region. Meng also gave a talk at the workshop that was organized alongside John's

defense, and that introduced our project and efforts to the academics and industry professionals present, and thus invited some healthy and much sought after close scrutiny. The workshop also gave us a deeper understanding of the different continental approaches towards the same problems, and provided invaluable opportunities for first-hand interaction and discourse between proponents of the different approaches and schools of thought.

Grammatical Framework (GF)

GF is a programming language for multilingual grammars. GF currently has rudimentary support for two Southeast Asian languages: Bahasa Indonesia and Thai. Legalese attended the GF summer school in Riga in the fall of 2017. By thus introducing our project, ambitions, and objectives to the community, we established good relations with researchers, academics, and GF and associated language experts that we are exploring collaborations and working relationships with.

British LegalTech community

Relevant Legalese objective: Social, Technology, Application

Legalese was invited to attend the inaugural Legal Geek conference in London which was attended by representatives from over 20 countries and featured over 40 startups in the legaltech space. As an industry conference, it afforded Legalese the opportunity to survey the British and European legaltech field. The wide scope of attendees and engagement also meant that Legalese was able to socialise with representatives from law firm initiatives, community efforts, government-level projects, as well as a myriad of activities happening at the law school, regional, and cross-institution level.

German LegalTech community

Relevant Legalese objective: Social, Technology, Application

Legalese was invited to give a talk in Berlin at the *Hacking Law* conference. It was an industry and technical gathering that at once engaged the legal and tech community in Germany. It set the stage for many of Legalese's engagement with the European thought leaders, industry leaders, law firm initiatives, and startups in the legaltech space.

Swiss LegalTech community

Relevant Legalese objective: Social, Technology, Application

Legalese was invited to give a talk and sit on a panel at the Swiss Legal Tech conference and hackathon. It is amongst the largest of its kind, and granted us the opportunity to interact with the legal and tech community in Switzerland, especially with regard the issues and problems that were particular to them. It was held in October 2017 in Zurich, and connected the Legalese co-founders with the European thought leaders, industry leaders, law firm initiatives, and startups in the legaltech space.

Haskell community / KADENA.IO and PACT

Relevant Legalese objective: Social, Technology

In April 2017 the Boston Haskell meetup hosted Stuart Popejoy from Kadena.io presenting Pact, his smart contract language, which sits in approximately the same place as Ethereum's Solidity. This presentation, together with a previous beer meeting with adjoint.io, validated our choice of Haskell as a development language. Kadena has, in less than 12 months, built a working high-performance blockchain and a smart contract language to go with it, with only a two-man team. It would not have been possible without Haskell.

RESEARCHERS & COMMUNITY LEADERS

Vermont Law School

Relevant Legalese objective: Social, Technology, Application

Legalese presented to Oliver Goodenough[10] (Director, Centre for Legal Innovation, Professor of Law) and Jeanne Eicks[11] (Managing Director for the Centre for Legal Innovation) on:

- the history of computational law (Prolog and the British Nationality Act[12]; Robert M Lee's Towards a Formal Language for Electronic Contracts[13])

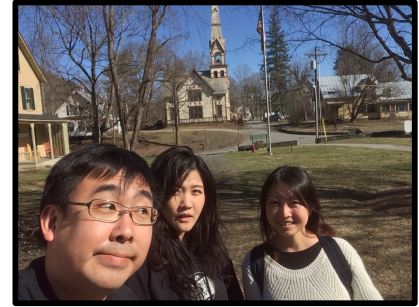---

[10] Oliver Goodenough https://www.vermontlaw.edu/directory/person/goodenough-oliver
[11] Jeanne Eicks http://legaledweb.com/jeanne-eickes/
[12] Prolog and the British Nationality Act http://opim.wharton.upenn.edu/~sok/papers/s/p370-sergot.pdf

- legaltech developments in Asia (Singapore Academy of Law releases 'Legal Technology Vision'[14] ; Singapore's FinTech regulatory sandbox[15]; Hong Kong's regulatory sandbox[16]; Dubai wants to move everything to the Blockchain[17])
- other legal and quasi legal technological efforts (Analysing Normative Contracts[18]; Hvitved's thesis[19]; LexifFi[20]; Digital Legislation - regulation as a platform[21]; another effort at the language[22]; Clack[23]; PurifyPlus[24])
- model checking of contracts (A case study[25])
- ontology building (Estrella Project[26]; LKIF core[27])

Other researchers and community leaders

Andy Milenius[28]

Relevant Legalese objective: Technology, Application

Andy is the COO of DappHub, a blockchain R&D Firm with a special focus on developer tools and formal verification. He is also a lead developer for the Dai Credit System (MakerDAO), a unique cryptocurrency that maintains price stability over short and medium term time increments.

He is especially interested in the mechanism design of decentralized governance and bootstrapping online communities. Andy is part of a small working group has formed among the language design enthusiasts of Ethereum to collaborate on a new programming language that targets the EVM.

Legalese and Andy have discussed working together on language design for Ethereum.

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[13] Robert M Lee's Towards a Formal Language for Electronic Contracts http://www.cse.chalmers.se/~gersch/slides-talks/slides-CL-ModelChecking.pdf

[14] Singapore Academy of Law releases 'Legal Technology Vision' https://www.sal.org.sg/Page-not-found/ctl/Access%20Denied/message/a52d68b9f3cf4c9c89714d2c0bd8240e

[15] Singapore's FinTech regulatory sandbox http://www.mas.gov.sg/News-and-Publications/Media-Releases/2016/MAS-Issues-Regulatory-Sandbox-Guidelines-for-FinTech-Experiments.aspx

[16] Hong Kong's regulatory sandbox https://www.reuters.com/article/us-hongkong-banks-regulator/hong-kong-to-launch-banking-fintech-sandbox-as-rivals-pull-ahead-idUSKCN11C0EV

[17] Dubai wants to move everything to the Blockchain https://www.coindesk.com/dubai-government-documents-blockchain-strategy-2020/

[18] Analysing Normative Contracts https://gupea.ub.gu.se/bitstream/2077/40725/1/gupea_2077_40725_1.pdf

[19] Hvitved's thesis http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.724.7779&rep=rep1&type=pdf

[20] LexifFi https://www.lexifi.com/product/technology/contract-description-language

[21] Digital Legislation - regulation as a platform https://digital-legislation.net/

[22] another effort at the language https://github.com/legalese/legalese.github.io/blob/master/doc/20170511.org

[23] Clack http://clacklang.org/

[24] PurifyPlus https://teamblue.unicomsi.com/products/purifyplus/

[25] Model Checking Contracts - A case study https://drive.google.com/file/d/0BxOaYa8pqqSwYS0yYk1OVVZXZlE/view

[26] Estrella Project http://www.estrellaproject.org/

[27] LKIF core https://github.com/RinkeHoekstra/lkif-core

[28] Andy Milenius http://tokensummit.com/speaker/milenius-andy/

Michael Aikenhead[29]

Relevant Legalese objective: Technology, Application

Meng met Michael at an AI conference in London (cogx.co) in June 2017. Michael agreed to be a technical advisor. Michael's experience with law and computer science, and at Haley with OPA, makes him an ideal fit for the technological research and application aspects of Legalese.

Haydn Jones[30]

Relevant Legalese objective: Technology, Application

Haydn is working on technology to regulate very large financial structures. He is currently the Founder and Managing Director of Blockchain Hub, a specialist FinTech strategy consultancy promoting and supporting the understanding and use of Blockchain technology across business communities with pragmatic 'test and understand' strategies. Its mission is to bridge the gap between the blockchain technology providers, and companies and organizations seeking to explore and benefit from this novel technology. Having trained as an engineer, and also called to the English Bar, makes Haydn uniquely suited to appreciate Legalese's computer science/engineering-driven approach to law. Together with Vinay, we are beginning discussions about a regulatory oracle that will be integrated with Legalese.

Vinay Gupta[31]

Relevant Legalese objective: Technology, Application

Vinay is a blockchain expert and strategist, and is also active in the Ethereum community. His presentation on the Internet of Agreements[32] at the Blockchain Summit provided strong guidance for Legalese's venture into the creation and crystallization of the *smart statutes* vision. Meng has visited Hexayurt Capital and met several times with Vinay and Rob Knight to discuss collaboration opportunities.

Inari Listenmaa[33]

Relevant Legalese objective: Technology

Inari is a PhD student in language technology at the University of Gothenburg and Chalmers University of Technology. Her research topic of grammar analysis of the Constraint Grammar formalism guides our thinking in language design. She has also given the team semi-informal workshops and seminars on her areas of expertise, in particular, Grammatical Framework.

Dustin Wehr[34]

Relevant Legalese objective: Technology

Dustin graduated with a PhD in Computer Science from the University of Toronto, under the supervision of Stephen Cook[35] and Alasdair Urquhart. As an MSc student, he worked in Computational Complexity Theory. Legalese has brought Dustin on to the team to work on L4.

Sue Gardner[36]

Relevant Legalese objective: Social, Application

Sue was formerly the longtime executive director of the Wikimedia Foundation, and a founding board member of the Ada Initiative (a nonprofit aimed at increasing women's participation in the free culture movement, open

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[29] Michael Aikenhead https://www.linkedin.com/in/michael-aikenhead-phd-6154b6/
[30] Haydn Jones http://www.itu.int/en/ITU-T/Workshops-and-Seminars/201703/Pages/JONESHaydn.aspx
[31] Vinay Gupta https://www.vice.com/en_uk/article/qbxej5/global-resilience-guru
[32] Internet of Agreements http://internetofagreements.com/files/InternetOfAgreementsTranscript.pdf
[33] Inari Listenmaa http://www.cse.chalmers.se/~inari/
[34] Dustin Wehr http://www.cs.toronto.edu/~wehr/
[35] Stephen Cook http://www.cs.toronto.edu/~sacook/
[36] Sue Gardner https://cyber.harvard.edu/people/sgardner

source technology and open culture). As an open source company building an open source domain-specific language in the traditionally male-centric and dominant environment of software and law, Legalese hopes to engage her on open source and on gender and social movements.

Patrick Murck[37]

Relevant Legalese objective: Technology, Application

Patrick was previously a co-founder of the Bitcoin Foundation where he served at times as General Counsel and Executive Director. Patrick has engaged regulators and policymakers in the US and Europe on bitcoin and the emerging digital economy. He was named among America's 50 Outstanding General Counsel for 2014 by the National Law Journal. The DSL Legalese is building expects to not just compile to natural languages but also high level programming languages that can be deployed to the blockchain. Legalese has leveraged Patrick's experience in conceptualizing use cases and technical implementation. Patrick introduced us to Adjoint.io.

*Stephen Diehl[38] (*Adjoint.io)

Meng spent some time discussing technology with Stephen, who is one of the most respected Haskell developers and popularizers in the world. Stephen is also a founder of adjoint.io, a blockchain company with their own internally developed smart contract language for financial applications. Meng welcomed Stephen's tentative plans to open source their technology, and encouraged the team to definitely do so.

John DeLong[39]

Relevant Legalese objective: Social, Technology

John serves on the advisory board of the Compliance & Ethics Professional magazine. His research focuses on the implications of technology changes on the framework and best practices for compliance, oversight, and ethics program. As a mathematician, computer scientist, and later Harvard Law School graduate, his insights and advice on the implications of computational legal are especially instructive to Legalese. John introduced Legalese to an interesting paper published by the NSA, *How a Bill Becomes a Bit*, about automating regulatory compliance in in the government context.

Paola Villarreal[40]

Relevant Legalese objective: Technology, Social, Application

Paola is a self taught systems programmer and data scientist. She works with the ACLU of Massachusetts on social justice projects that heavily rely on open technology and data. As a leading open source and social justice advocate, Paola's perspicacity and technical expertise has helped Legalese conceive and construct the data tools we would need to democratize contract drafting and provide better access to justice.

Dirk Hartung[41]
Relevant Legalese objective: Application
Dirk is the executive director of legal technology at Bucerius Law School.
Our discussions revolve around the pedagogy for the next generation of lawyers, deep tech legal technology that goes beyond e-discovery and practice management, and the isomorphisms between legal reasoning and software engineering. We hope to work with Dirk and with Jack Cushman[42] to design a course on legal programming that focuses on automated reasoning enabled by formal logics for law.

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[37] Patrick Murck https://www.cooley.com/people/patrick-murck
[38] Stephen Diehl https://www.adjoint.io/pages/team.html
[39] John DeLong https://www.rsaconference.com/speakers/john-delong
[40] Paola Villarreal https://news.harvard.edu/gazette/story/2017/01/sifting-data-seeking-justice/
[41] Dirk Hartung http://law-school.academia.edu/DirkHartung
[42] Jack Cushman http://hls.harvard.edu/faculty/directory/11655/Cushman

Involvement of project beneficiaries, during all phases of project implementation.

Over the course of the last 1.5 years that the first version of Legalese's web application has been live, Legalese has been observing, taking notes, and handholding end-users as they interacted with the product. To date, dozens of JFDI (the first startup accelerator and incubator in Singapore that was founded by Meng) startups and three non-JFDI startups have used Legalese v1 to produce paperwork for their financings. Other startups did approach us to ask for help but we had to turn them away as we decided our energies were better spent automating the process for future startups (rather than manually assisting the current ones). Traditional legal services do not enjoy the automation alternative; we do, and we don't want to be stuck in the unscalable model.

The consolidated insights from working with these beneficiaries, combined with the team's experience being both ex-lawyers and clients, are currently being translated into the user interface and experience for version 2 of our product.

V2 product development is now well underway. In January 2017, three members of the Legalese team visited an agile development shop based in Bangkok which we have known for many years. They assigned us a full-time team of developers + project manager + tester + designer.

Based on current velocity we expect to reach our Angel Tranche 2 milestones by the end of the year. So, product development is on track. Alexis, having inhaled a number of UX books, is taking the role of acting product manager, attending online meetings with the dev team on a daily-to-weekly basis; Meng takes the role of senior product manager and weighs in with technical contributions on our Slack chat.

It is notable that the development team are in Bangkok. Our v3 product relies on a software package called GF, which is a programming language for multilingual grammars. GF currently has rudimentary support for two Southeast Asian languages: Bahasa Indonesia and Thai. It is possible that at some point in the future we will rely on the Thai language skills implicit in the Bangkok development team to work on Thai-language startup contracts.

Gender, ethnic and generation gap issues that have impacted positively or negatively your project implementation.

Gender

It is well known that technology tends to be male-dominated. This is not necessarily true in Bangkok, where a large proportion of our dev house is female: of the 7 people working on Legalese there, 3 are female. During the term of this grant we have heard extraordinary news from Silicon Valley of bad behavior at Uber and in the VC community. This news reminds us to use every opportunity, especially during our conference travels, to evangelize our project among less represented sectors in technology. For example, we met a female Iranian CS PhD specialist formal methods and may in future attempt to recruit her to join our project.

Positive: Guy Kawasaki in *Art of the Start* advises startups to ask women about their business plans. He argues that women are better judges of viability than men are. Legalese has a female cofounder.

in January 2017, we closed Tranche I of our angel fundraising round with venture capital firm, Walden International as lead investor. Hearteningly, it was a pair of women at Walden's helm, Kris Leong and Yong Soo Ping, that gave us that vote of confidence.

Negative: We observed outright sexist comments (e.g. "Alexis can sit on my lap" from an investor) and less overt sexist assumptions in our interactions with potential investors, and the tech-bros community looking to get on board. It has made us more conscious of creating inclusive and supportive policies from the outset to ensure that everyone interested in our project is able to participate and engage with the community in a safe and constructive way. We are also looking into establishing a code of conduct so that Harvey Weinstein-type

situations are ideally avoided, and if not avoided, handled in a sensitive, supportive, fair, and competent manner.

Ethnic

Legalese is based in Singapore, but as a remote-first company with contributors based internationally, we've encountered and have had to learn the different communication styles across the globe. For instance, we observed that our development team in Bangkok were reluctant and reticent in raising tensions or unclear instructions (preferring instead to work off untested and often inaccurate assumptions). Encouragingly however, our attempts at creating opportunities and platforms through which they can openly and easily ask any question (however simple) have resulted in better communications across the board. Our two v1 developers are also fairly junior, with Legalese being their first job "in the real world" so to speak. Coupled with their upbringing and conditioning in conservative cultures, we've had to actively encourage them to speak up, engage, and be less afraid to rock the boat or ask questions.

Indicators

The indicators below correspond to the Project Implementation Details set out in the original grant application. They are described in greater detail to fulfil the SMART criteria.

Indicators	Baseline	Progress assessment	Course of action
Version 1's interface usable by Legalese with assistance from the software development team.	Google Sheets user interface not usable by assistance -- not accessible by the public, no indicators of where and how to start. Users were not able to, and as such were not using the application on their own without guidance. Most had to reach out to the Legalese team to request that we act as the interlocutor, interpreter, and service provider as these users were unable to use the web application for document generation on their own.	**30 August 2016** Legalese.com domain name was acquired and built. Subsequently, the website was built on readme.io, where a direct link to the Version 1 Web Application (on Google Sheets with a JavaScript backend) is accessible by visitors to the site. **30 August 2016** The Legalese team started to physically sit by and guide the end-users. This involved Legalese members handholding such users as they proceeded with using the application as many of the functions and input required intimate knowledge of industry jargon and the back-end functionalities of the application.	This has progressed as planned and expected. It was a significant milestone as it familiarized us (and confirmed our hypotheses) with the users' mindsets, their technological sophistication, base expectations, and their understanding of their own problems. We further affirmed our original hypotheses that users are generally clueless as to what the scope of the legal problem is. For instance, in general, users think they only need one single document (e.g. an investment agreement) to effect an outcome, without realising that such a document is toothless and possibly unenforceable if unaccompanied by quasi-legal documents (such as directors' resolutions) needed to effect the outcome.

Indicators	Baseline	Progress assessment	Course of action
Version 1's interface usable by end-users directly with assistance by the Legalese team.	Google Sheets user interface not usable by assistance -- not accessible by the public, no indicators of where and how to start. Users were not able to, and were not, using the application on their own. They were asking the Legalese team as a service provider to use the web application for document generation.	**30 August 2016** The Google Sheets interface of the Version 1 Web Application was updated with headnotes and explanatory statements. These act as signposts for the different functions available; telling the user how to fill in the form to generate their documents. **10 December 2015** A tutorial walkthrough was designed and created for an End User License Agreement. As a step-by-step handholding walkthrough, users are familiarised with the features, functions, and document-generating workflow on the application. **30 August 2016** Users were invited to join private channels on the Legalese SLACK. This allowed them 24/7 availability to team. They've used it to ask questions about generating documents, submit bug and error reports, seek general business advice, and to indicate any perceived roadblocks or tensions they encountered using the application.	This has progressed as planned and expected. It is clearly not the end-goal for the web application, but an important milestone so we can observe and learn from what users have trouble with in their interaction with the Google Sheets interface. These learnings feed into the next stage of our product roadmap as we aim to smoothen these kinks out in the self-contained web-application we are building as Version 2 of the product.
Creation of a smart captable and recognition of ESOP classes in the Version 1 product	No smart captable or recognition of ESOP classes.	**1 November 2016** A preliminary smart captable in the Google Sheets-based product. Simple forumalae was used to auto-update the fields in the Captable based on users' different input on the product **1 December 2016** There now exists a tab for ESOP classes and vesting in the Google Sheets-based version 1 product.	We realised that users in SEA were fundamentally inexperienced with Google Sheets or excel formulae as most of them were non-technical founders. This meant that for users to truly benefit from a smart captable that they could use independently, we have to move away from the Google Sheets user interface. As we are building the version 2 of the product, we are also running the concierge-MVP support services helping existing users with their use of the application. In such situations, the Google-Sheets based captable is still functionally useful to us as a reference table and tracker.

Indicators	Baseline	Progress assessment	Course of action
Enhancements to Singapore workflows	Data of companies in Singapore had to be manually filled in, and may not necessarily correspond to the factual data that was filed with the state registrar.	**15 July 2016** Met with the state registrar and regulatory body in Singapore (ACRA) to ascertain and discuss the development of an API, through which we could pull verified and correct data relating to Singapore companies. **9 January 2017** Pursuant to the earlier meetings had, the conclusion was that there would be no API made available by ACRA in the near future. However, Legalese built an interim workaround: a scraper that would allow us to pull data from Questnet (a legacy third party data provider consuming the same ACRA data we required) until the API is made available by ACRA.	Due to unforeseen developments at the state registrar and ACRA, none of which we could have controlled or foreseen, we've had to settle for workaround fixes until the Singapore registry actually releases an API or new plan for unaffiliated / third party companies to pull data from their databases. Pulling data from a scraper via QuestNet (i.e. the workaround fix we built) would cost us money per retrieval, but we concluded that having such data readily available for our users is an integral part of the product (as it reduces friction and validates data that users may not know for sure). As such, given that the current costs of data retrieval aren't too prohibitive so as to stall development or cripple the business model, we are cautiously proceeding with paying for such data retrievals.
Enhancements to Singapore workflows	No custom choice signatories for execution pages of the generated documents -- this created inflexibility as users could not elect specific signatories for the agreement and had to default to signatories as they were first entered into the system.	**28 December 2016** We rewrote the code for the execution pages to allow custom election of signatories.	This was a feature that we had not envisioned or predicted; it only came up when users (including our own team members) started actively using the product to generate documents. Creating such an element of flexibility (that is still enforceable within the eyes of the law) was an important step towards better user experience and user empathy as it better aligned the product with commercial realities. For instance, many of the Southeast Asian entrepreneurs were frequently travelling and as a result, different people (albeit having the same title) were in charge of signing different documents in the same workflow. The signature blocks therefore had to allow users to elect specific signatories for their documents instead of defaulting to the same few signatories in the order in which they were first arbitrarily entered by the users into the system.

Indicators	Baseline	Progress assessment	Course of action
Unit tests to verify workflows	No unit tests for testing of new patches to the v1 Google Sheets based product Generation of templates on the Product were not logged or trackable by Legalese. This meant that we had no visibility over failed generations on the Product.	**19 April 2017** Automated script written to test patches to the Google Sheets based product so that bugs and errors can be detected and fixed before going live **3 October 2016 – 29 March 2017** We reworked the codebase to ensure that generation of templates and documents on the Product were logged and examinable at all times, so that we could identify any errors or delays on the backend.	This is a first step towards unit testing different parts of the Google Sheets-based product. Currently in the works are unit tests for convertible notes (the chosen product to be focused on for v2).
Workflows for our partners	No workflows for partners	**1 January 2017 to 1 April 2017** Met with various partners who raised the idea of incorporating their proprietary documents as workflows in Legalese. However, most were either 1. unable to translate their templates into code; or 2. were reluctant to have their proprietary documents made available to the other users on Legalese	Due to the decision taken to focus only on Y-combinator's convertible notes for V2 of the Product, we decided to shelve this to the backburner until we had a suitable partner whose documents were in high enough demand to justify dedication of Legalese manpower to translate such of their templates into code.

Indicators	Baseline	Progress assessment	Course of action
Execution workflow	The developers and general community who are not legally trained did not and had no way of understanding the interactivity between the various documents in workflows	**7 May 2017** We created a simple spreadsheet that set out the various features of different fundraising workflows and instruments. This allowed our developers to have a bird's eye view of the characteristics of the fundraising workflows they were involved with developing.	We had overestimated the sophistication of the developers in understanding the interaction between documents in workflows. This was in part due to expertise blindness on our part. We realised that we needed to proactively write documentation and explanations that explained what was intuitive / obvious to those of us who are legally trained or experienced in fundraising paperwork. This meant that other development deliverables were held back as knowledge and mapping documentation needed to be created and written to ensure that everyone had a good understanding and oversight of the various moving parts.
A simple and beautiful front-end with defaults that pre-fills and wraps the v1.0 spreadsheet	The Google Sheets based web application is the only interface, but it required handholding and guidance from members of Legalese	**8 January 2017** Development of version 2 went into full drive, but a few months was needed for the developers to first get familiarised with the logic and code that we had built in v1. As v1 had arisen out of need, many of the fixes and nomenclature used were not well-thought out or self-explanatory enough for the v2 developers to work from. The v2 developers were also not familiar with the end users' psyche and needs, as such, many of the user interface and experience features had to be specially spelt out and walked through by the Legalese members who were actually familiar. **October 2017** Significant progress has been made on the front end, but we were further stalled by complications in integrating a signature service within the web form.	We had underestimated the development work required for v2. A standalone web-application with a beautiful and intuitive interface required many more moving parts than we had envisioned: design, front-end development, back-end development and integration. However, we are still progressing and smoothening out the kinks as we go along. An alpha version of v2 is available at: http://ec2-54-169-137-148.ap-southeast-1.compute.amazonaws.com/

Project implementation

Project activities	Input	Outputs	Timeline	Status
Launch v1 for public consumption, albeit on a concierge support model	Fundraising workflows and Legalese v1 expert to walk users through the product. Technical expertise to handle bug reports. Server, web hosting, and related maintenance fees for the Product and Website.	The application v1 launched to and used by the public. Project website built to host different resources, walkthroughs, institutional knowledge. 2 developers to maintain, update, and solve issues that arise on the backend. Dedicated Slack channels for technical and product experts on the Legalese team to interact with the end-users.	30/08/16 v.1 app released. 30/08/16 Website built and published. 01/11/16 developers hired for backend support and ongoing fixes	Completed
Launch v2 web application with fully automated user interface	v2 development team hired to build the product with clear deliverables. v1 developers and domain experts still on payroll to provide bridge to v2 and ongoing maintenance and support. UX and UI resources to design interface for v2.	The alpha version of the application is complete and available at: An alpha version of v2 is available at: http://ec2-54-169-137-148.ap-southeast-1.compute.amazonaws.com/	08/01/17 - development began 11/17 – new website ready for launch, and alpha version 2 of product also available for testing and use on a alpha-basis	Completed
A simple working DSL	Education to help the team understand the potential and practicalities of the v3 work. V3 development team staffed with programming language researchers.	Experimental drafts and initial design documents. Language specification and documentation.	July 2017 – hired first PhD researcher to accelerate development. researcher has helped build YC SAFE contract template and semi-formalize the contract in BPMN 2.0. Drafted a '*Compass Rose*' diagram to orient and relate different parts of the project. Drafted an Introductory course outlining readings that help to educate team members about the underlying theory and technologies. Documentation for DSL created. DSL created, though not to fullest extent. See https://github.com/legalese/legalese-compiler/blob/master/linear_state_machine_language/L4-LSM-Formal-Semantics-LaTeX/L4-LSM-semantics.pdf for more details.	Completed

Project Management and Sustainability

Administration

The ISIF funds have greatly helped with allowing the much-needed interaction with the international legaltech community, computer science researchers, and open source community.

For instance, it paid for our ticket at FOSSASIA where the engagement with the regional open source community brought in interested research collaborators and open source enthusiasts who were technically skilled in Haskell and the other programming languages we've been researching on and building off.

ISIF funds also allowed us to attend Codex's FutureLaw conference at Stanford. From that, we were invited to participate in the Computable Contracts initiative at Stanford, participated in a demo day which Stanford law school, codex, and the design school were organizing, and have open doors for us to engage further with the other academics we met at the conference. We have benefited greatly from the access and network effect the ISIF funds have enabled. Many of these engagements have led to open source contributors coming on board our project, greatly expanding our community and collective expertise.

Staffing

ISIF funds was the enabler for our v1 development team. Without ISIF funds, the team's members would have had to do the maintenance and support work on our own. Instead, with the ISIF funds going towards the v1 developers, Meng, our CTO was able to work on the deep tech R&D aspects of things at Harvard's Berkman Centre.

Procurement

ISIF funds helped us purchase information resources required for the development of the domain specific language. Many of the logic and mathematical books were not readily available in SEA and had to be ordered via Amazon.

Credibility

An investor at globaleir.org commented: "Some investors will be interested in your (proven?) ability to attract grants that have gotten you a decent way in so far".
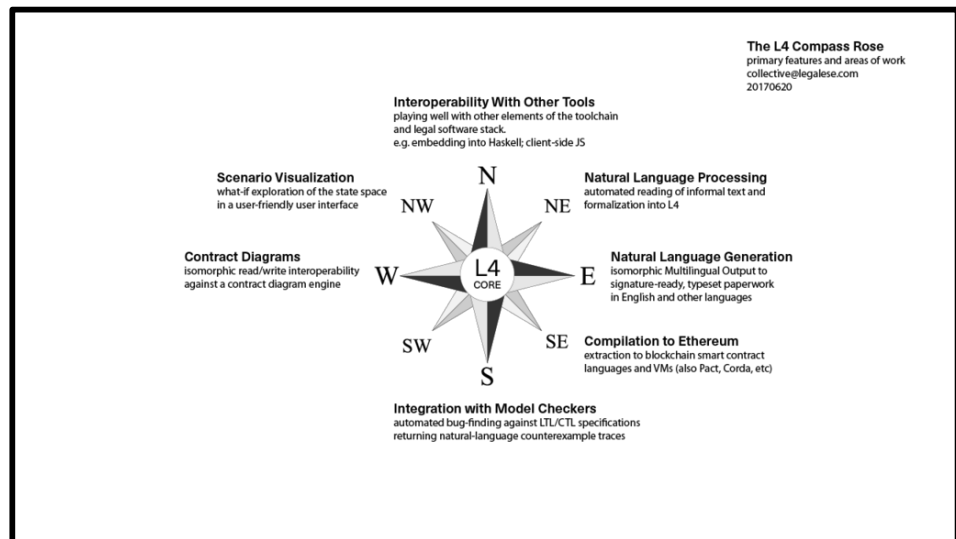
Project Outcomes and Impact

The middle-term outcome of v1 having been built is the validation of the need that emerging SEA first-time entrepreneurs have with regard fundraising documentation. Instead of having to DIY hacked-together solutions that are not applicable to their countries, they now have an on-demand source from which they can generate their own documents. Fully aware that we're not a law firm (highlighted by us emphasizing that on many fronts), many users were nonetheless willing to use us. This fits into what Clay Christensen described as having an "underserved market" as these users were unattractive to traditional incumbents (e.g. law firms) and did not possessing the financial means or desire to engage the services of the existing service providers to begin with.

Our aim is to continue focusing on this target market, but to introduce scalability into such an assisted-DIY model. By building a fully-automated interface with smart defaults, embedded user education, and automated legal logic, we aim to eventually be able to help these entrepreneurs at scale. At present, the concierge-service model is hamstrung by the expensive human labour, attention, and time required to support it.

Our original objectives when it comes to impact (as described in the grant application and in the earlier parts of this report) remains as described.

Overall Assessment

There is a clear need for affordable legal documentation and solutions, especially when even the freely available resources are domiciled in and catered to the US and European markets. However, in order to provide the solutions at scale via technology, one needs to recognize that such a solution is by nature cross-disciplinary – sitting at the intersection of law, computer science, internet infrastructure, established financial and legal systems,

and vertical-specific regulations. With this then is the implication that there is but a very small pool of people from which one would work with, as they'd need to be able to meaningfully and synergistically straddle more than one of these domains to provide the effective and scalable solutions that are sought.

The scarcity of these domain straddling experts thus creates very high opportunity costs for their attention and time. In choosing how and what to spend our time on, the team has had to make difficult decisions and wrestle with the expensive trade-offs. Increasingly, we have realized that there are some time-consuming tasks, like administrative work and basic development, that although expensive and seemingly trivial, are ultimately better off outsourced.

The project has not met its long-term objectives, but it is making good time on getting there.

We have realized the importance of design thinking and active user experience mapping.

We have also realized the importance of regular stand-up / meetings. *Slack* being 24/7 is great, but messages can sometimes get lost as people's participation vary over time. It was also educational for us to realize how much the team valued face time and individuated attention; it not only kept morale up, but also mitigated several episodes of miscommunications as it built trust within the team.

Recommendations and Use of Findings

User of these findings: other platform based startups with a strong R&D element, startups who are holacratic and remote-first, and startups that work with teams that do not have English as their first language.

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