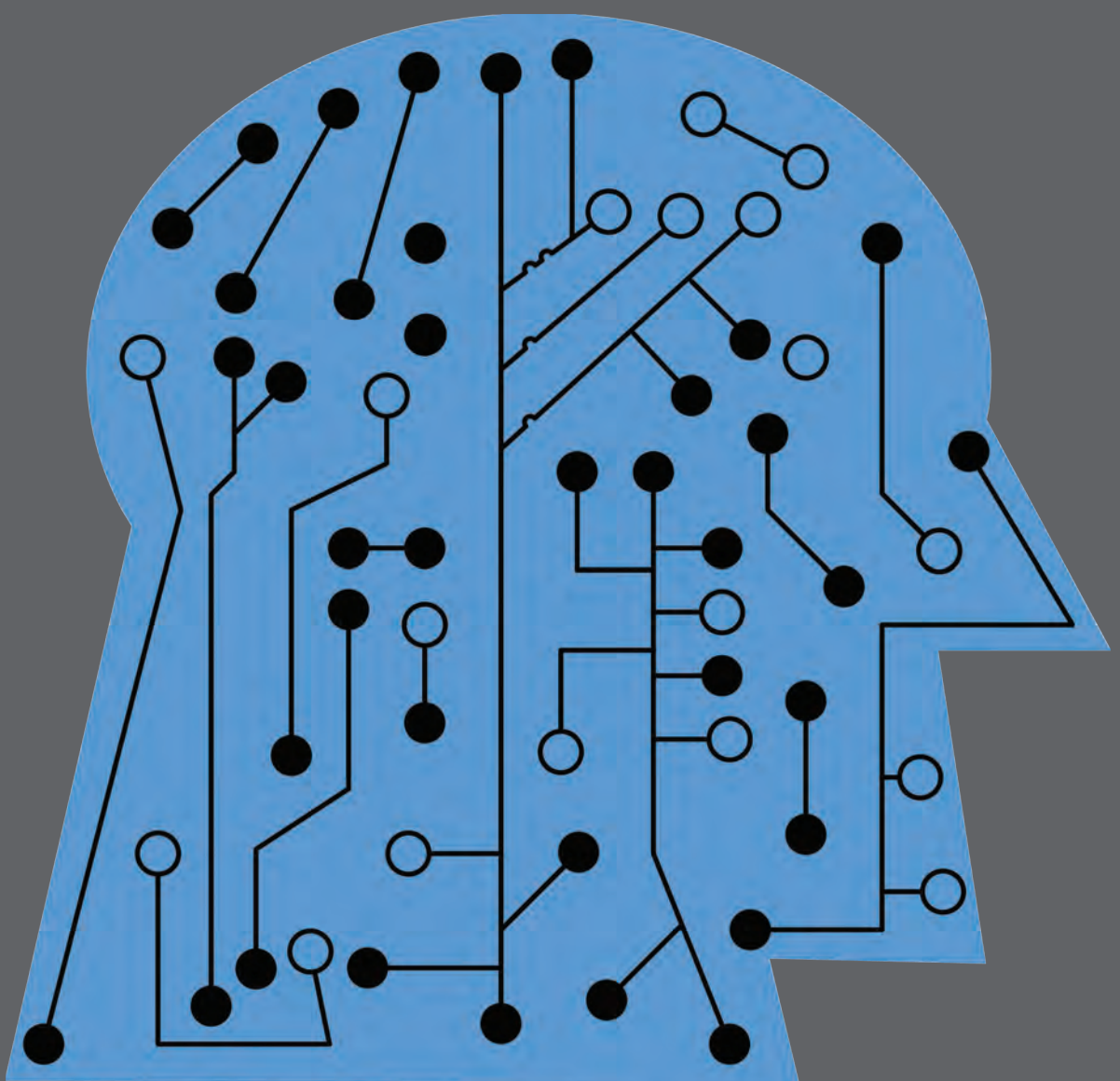
SINGAPORE
ACADEMY OF LAW

Legal Technology
VISION

Towards the digital transformation of the legal sector



Published 2017

© Singapore Academy of Law
All rights reserved. No part of this publication may be reproduced, or transmitted in any form or by any means, or stored in a retrieval system of any nature, without prior written permission of the Singapore Academy of Law.

Please direct comments and feedback to:
Legal Technology Cluster Secretariat
Singapore Academy of Law
1 Supreme Court Lane, Level 6
Singapore 178879
Email: lawnet@sal.org.sg

ISBN 978-981-11-2202-6

Legal Technology Vision

Towards the digital transformation of the legal sector

Legal Technology Cluster Committee

Singapore Academy of Law

CONTENTS

CHAPTER 1: INTRODUCTION ____ **3**
- A New Paradigm 3
- Legal Technology: Overview 4
- Rationale of the Legal Technology Vision 6
- Approach of the Legal Technology Vision: the $(AI)^2$ Model 7
- The Development of the Vision 9
- About the Legal Technology Cluster Committee 10

CHAPTER 2: ACHIEVING ADOPTION OF A BASELINE SET OF LEGAL TECHNOLOGY ____ **13**
- For Whom the Baseline is Drawn 13
- Establishing the Baseline 14
- Achieving the Baseline 15

CHAPTER 3: IMPROVEMENTS TO SERVE THE LEGAL INDUSTRY ____ **21**
- An Overview of Possible Improvements 22
- Improving Collaboration 22
- Improving Access to Legal Services 25
- Improving Access to Legal Knowledge 26
- Improving Connectivity to Public Sector Digital Services 28
- Delivering Improvements 28

CHAPTER 4: IDENTIFYING INNOVATIVE CONCEPTS ____ **31**
- The Case for Public-Private Collaboration 31
- Exploring the Possibilities 33
- Data Analytics, Machine Learning and Natural Language Processing: An Introduction 33
- Blockchains 40

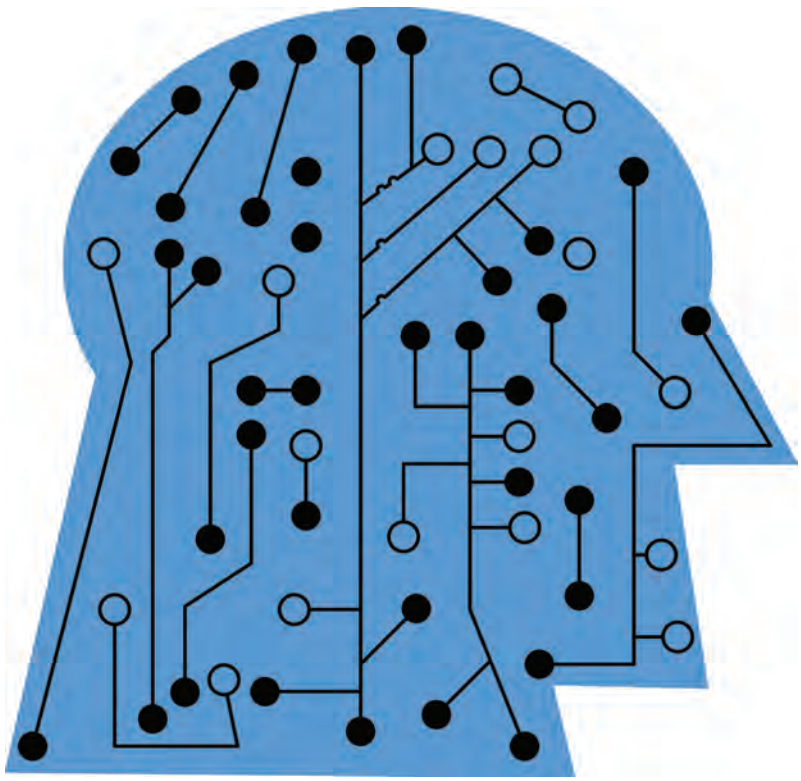
CHAPTER 5: ACCELERATING LEGAL TECH — INCENTIVISING AN ECOSYSTEM ____ **45**
- Disruption Facing the Legal Profession 45
- The Idea of an Ecosystem 47
- The Importance of a Broad Network for Legal Tech 48
- Collaborating with Universities and Research Institutions 50
- Access to Capital 52
- Addressing Demand 52
- Planting the Seeds of Innovation 52
- Leadership and Governance 53

CHAPTER 6: FROM CONCEPT TO REALITY ____ **55**

ANNEX A ____ **58**
- Legal Technology Vision Working Group 58

ANNEX B ____ **59**
- Participants in Legal Technology Vision Retreat 59
- Participants in Focus Group and Consultation Sessions 62

Legal Technology Vision



> This Legal Technology Vision is a call to action for lawyers – whether practising in law firms or serving as in-house counsel in corporations – *to become part of the disruption* that faces the legal industry today.

Chapter 1: Introduction

A New Paradigm

1. Meet Fiona Chan, a 31-year old Singaporean on maternity leave with a big idea. Fiona wants to set up a web-based platform to match freelance content creators and editors with clients in the private and public sectors. She has several interested investors on hand, and a wide base of keen freelancers knocking at her door. Fiona turns to Rocket Lawyer, a US-based company offering contractual templates at affordable rates. She downloads as a free sample a draft shareholders' agreement and proceeds to customise it to suit her needs, with help from her Singapore-qualified lawyer husband. With her arrangements with investors in place, Fiona turns to Law Canvas, a Singapore- and Malaysia-based company offering template agreements much like Rocket Lawyer, but with the tenor of the templates more in line with domestic law and practice. She downloads (also as a free sample) an independent contractor's agreement, which contains clauses to protect Fiona's company from potential employee claims. Over email, a lawyer from Law Canvas' panel helps Fiona amend certain provisions in the document to suit the specific nature of Fiona's business. Fiona then asks each and every interested freelancer to execute the independent contractor's agreement before any work begins. As of 2016, Fiona's company is turning in an annual revenue of approximately $400,000. Her legal fees? Zero.

2. The disruption of the legal profession in Fiona's true story is minor, but it is disruption all the same. And it is a story that is being replicated the world over in every sector that has similarly been disrupted by technology, with concomitant repercussions for legal services providers serving those sectors.

3. Two key takeaways stand out from Fiona's story. First of all, the lost value of legal work that could have been charged to Fiona can no longer be recaptured with existing business models. Indeed, neither even Rocket Lawyer nor Law Canvas succeeded in capturing that value as *legal services*, although it is likely that both these companies will meet with more success in retaining Fiona as a paying customer in the future. Second, there is nevertheless significant room for new types of bespoke and other lawyering services in the new economy. For example, without the solicitousness of Law Canvas' legal advisors (the company had just started up at the time and was aggressive in establishing itself in the industry, and had therefore complemented their legal technology services with *gratis* legal advisory services for promotional reasons), and had she not had a husband who is a Singapore-qualified lawyer to turn to, it is probable that Fiona would have paid for a consultation with a lawyer (whether online or face-to-face) to ensure that her contractual documents were inorder.

4. This Legal Technology Vision is a call to action for lawyers – whether practising in law firms or serving as in-house counsel in corporations – to *become part of the disruption* that faces the legal industry today. It is no exaggeration to say that as a profession, we lawyers are standing at a crossroads: and the better view is that instead of choosing to resist the tide and ignore the disruption *and potential*

benefits of legal technology, we should do our best to ride its crest and participate in the cooperation between private and public spheres to build the next paradigm for legal services. In the impending upheaval, there will be tremendous scope not only to improve upon existing practices in the legal sector, but also to rectify existing and ingrained problems.

5. Key among these problems is that of access to justice, as well as its handmaiden, access to legal services generally. The facilitation and promotion of these forms of access are a fundamental mandate for all in our honourable profession. The wave of disintermediation brought about by the Internet continues to find new and higher watermarks. The World Wide Web makes legal information much more easily accessible to the man on the street and as a profession, lawyers have had to deal with increasingly sophisticated and well-informed clients. The natural progression of this trend is that there will be demands for more legal information services that are accessible online to serve the needs of the public. Just as in other sectors, room for new intermediaries is created in the wake of the disruption: take the travel industry as an example. The disintermediation that so severely affected the business models of travel agencies was followed by subsequent waves of innovation that brought us hotel booking portals and, more recently, home sharing portals. Legal services as an industry is not immune against these forces and as an honourable profession dedicated to the pursuit of justice, we must consider how best to serve the expectations of the public for greater access to legal information and self-help solutions. No doubt that this will involve re-examining existing business models and the practice of law, but there can be no sacred cows for our profession as we consider how best to deliver law and justice to the public.

6. Once lawyers are able to see the disruptions in their industry as opportunities instead of impediments, there is every reason for optimism. To be able to achieve this change in perspective, we begin by considering the characteristics of the principal driver of change: legal technology.

Legal Technology: Overview

7. The phrase "legal technology" or "Legal Tech" is almost oxymoronic; the practice of law, so often exemplified through crumbling tomes and ancient courthouses, is at first blush strange bedfellows with anything state-of-the-art. In some ways, the disconnect between the two is captured in the extent to which legal markets have resisted the adoption of technology. To understand what legal technology actually is and why it has elicited a conservative approach from the industry, it is necessary to first understand the fundamental nature of legal services.

8. Legal services are *not* merely the provision of legal advice to clients by *law firms*. Law firms are just one medium through which legal services *may* be furnished; but at a basic level, legal services provide legal knowledge to any entity in need of assistance with the law. In other words, a legal services provider turns its knowledge into value for its users. These users could be clients in the traditional sense, but could also refer to judges, prosecutors, non-profit organisations or simply curious laypersons.

9. Legal technology, then, is technology that enables a legal services provider to *better* provide value to anybody involved in understanding or applying the law. But what is "better"? Legal research is already being augmented by plain language queries and search algorithms regularly refined via data analytics. The making of legal policy may be enhanced with insights gleaned from data or trends gleaned by computational extraction from court judgments. The drafting of contracts – and perhaps more ambitiously, the execution of the same – could be automated through smart document assembly and blockchain technologies.

10. Unfortunately, a modest level of technological literacy amongst lawyers, the all-too-common view that legal technology adversely disrupts the established legal ecosystem, and adherence to the assumption that the lawyer's craft should only be practised bespoke thereby rendering it immune from technological disruption, have all contributed to the industry's slow adoption of technology. All of these factors arise from a lack of *accessible* information about the nature and potential of legal technology. Properly mustered, legal technology can greatly help legal services providers in their provision of legal services; and with a better understanding of the capabilities of legal technology, legal services providers will be able to better understand the opportunities available to them.

11. However, legal technology is not *only* for lawyers. Far from it. Legal technology will likely usher in an era of unprecedented legal self-help and collaboration, with grandmothers eventually being able to write and execute their own wills without assistance from legal counsel (or less-than-well-intentioned relatives). The changes wrought by technology within the legal industry will likely be matched or even eclipsed by those precipitated outside the industry. Having said that, the effects of legal technology on stakeholders outside the legal industry – such as consumers – are beyond the scope of the present exercise.

12. The focus of the Legal Technology Vision, therefore, will be circumscribed to lawyers in practice and in-house legal counsel. In particular, the Vision seeks to answer the following specific question: how will legal technology be important to and affect the work of law firms and in-house legal departments over the next five years? To be sure, with advances in legal research and drafting provided by technology, there will be unquestionable improvements in the existing modes of legal services delivery to both external and internal clients. There will also likely be *new* ways of delivering legal services. These incremental improvements and disruptive innovations will combine to create a highly competitive legal services environment both within Singapore and regionally – and given borderless technologies such as cloud-based data rooms, perhaps even globally. The upshot is that innovations in legal technology will invariably be followed by the re-engineering of existing business models utilised by legal services providers.

13. In answering the question canvassed above, it is also hoped that lawyers and in-house legal counsel will come to be alive to two logically subordinate but no less important concerns. First, how should law firms, lawyers and in-house legal counsel make new legal technology services available to their respective clients? This is a medium-term question, and as existing structures of work continue to persist in their illusion of long-term viability, it can be easy to see how the legal profession at large would prefer to elide it. However, to borrow the eloquent words of Theodore Levitt (writing in 1960

on utility company monopolies), lawyers will almost certainly have "to plot the obsolescence of what now produces their livelihood"[1] if they are to survive in the digital economy. If an incumbent chooses not to avail itself of the advantages precipitated by legal technology, a smaller, agile and more competitively priced market entrant almost certainly will – with unfortunate consequences for the former.

14. The second concern goes further: how should the legal profession prepare for the elephant-in-the-room scenario where clients ultimately use legal technology services to completely fulfil their legal needs without the ostensible need for lawyers? To be sure this question is one that can and should be addressed over a longer time horizon, since for many transactions and disputes (particularly those involving large sums of money) the status quo is likely to be maintained for some time more. Nevertheless, it is imperative that law firms, lawyers and in-house legal counsel start thinking about this ultimate scenario as early as possible. It is a reality that many junior lawyers are inheriting from their senior partners and managers outmoded, low-tech businesses that will, before long, no longer be fit for purpose. Add to this the fact that these same senior partners and managers are likely to be, on the one hand, completely focused on the daily grind of managing their current practice, and on the other hand, complacent with the status quo, and the depth of the problem becomes readily appreciable. Such senior partners and managers will be none too interested in steering a future-proof course for the next generation of lawyers in their firm or organisation; to use a motoring analogy, they may not think that the tyres on the car require replacement, and even if they do, they are unable to drive the car and change the tyres at the same time. A positive approach to the matter is therefore required: traditional law firms must think of ways in which lawyers can take the lead in creating Legal Tech solutions and devise business models that *complement* the solutions provided to end users by legal technology, thereby improving access to justice.

15. The preceding paragraphs have raised many issues and talking points that we will unpack further in subsequent chapters. For now, however, it is important to acquire an understanding of the overarching purposes of the Vision, as well as the approach to be adopted by the Vision over its proposed five-year time horizon.

Rationale of the Legal Technology Vision

16. The Legal Technology Vision serves three broad purposes at three disparate levels. The first of these is to provide an overarching road map for the *legal sector in Singapore*, informing stakeholders of the general direction that technological developments in the sector will take. The guidance and insight provided by the Vision will better enable law firms and companies to factor legal technology into their business plans. In addition, by setting out in the Vision the many new technologies both presently available and on the horizon, it is hoped that innovation in the design of next-generation legal services may be sparked.

---

[1] Theodore Levitt, "Marketing Myopia", Harvard Business Review (July-August 1960) at p 47.

17. The second purpose of the Vision is that of a call to action for *legal technology providers*. There is much room for public-private collaboration in legal technology innovation, particularly in Singapore where the government has been unstinting in its efforts to transform the city-state into a global smart city and nation. For example, standards will have to be set to ensure interoperability between nascent technological products and services. These standards will necessarily have to be tailored through ongoing conversations between the public and private sectors, given the shortage of technical expertise in the former and coordination issues that may arise in the latter. Standards setting in data portability, in particular, will help facilitate legal technology solutions provide the quality of user experience expected by the savvy modern user. More can be done, for example, to help legal technology solutions connect with existing public sector digital services through application programming interfaces ("API"), allowing for deeper integration and a richer user experience. With strong public-private collaboration, it is hoped that an ecosystem encouraging legal technology innovation may develop in Singapore in time.

18. The third and final purpose of the Vision is to reassure *lawyers* that the future is not as frightening as it might appear to be, and that assistance will be provided to any and all who are willing to change their present ways of doing things. This assistance could come in a variety of forms such as skills-acquisition programmes, clarity in the identification of likely legal technologies to be adopted nationwide, as well as the provision of feedback channels for lawyers to give their inputs on how the legal industry should look like in the not-so-far future. In addition, for lawyers who are prepared to digitalise the provision of legal services, assistance may come in the form of providing opportunities and fora for the meeting of like-minded individuals from relevant disciplines so that the enterprising lawyer, computer engineer and financier may find each other. The result, it is hoped, will be the widespread adoption of legal technology that Singapore has chosen to invest capital in, thereby allowing for the maximisation of returns. It is also hoped that lawyers and legal technology providers will come to be engaged more openly and frequently to foment greater levels of public-private co-creation, as stakeholders seek greater participation in identifying advances in infocomm media technology that may be adopted and adapted for the legal sector to create legal technology solutions for existing challenges and provide new growth opportunities.

Approach of the Legal Technology Vision: the (AI)^2 Model

19. The Legal Technology Vision is fundamentally a developmental road map that takes place over a five-year time horizon. A four-pronged approach is envisioned, with efforts in respect of all prongs beginning simultaneously but with visible results for each prong to be delivered in chronologically distinct phases.

Three broad purposes:

1. Overarching road map for legal sector in Singapore
2. Call to action for legal technology providers to public-private collaboration
3. Reassurance that assistance will be provided to any and all who are willing to change

20. The first prong defines the *baseline* suite of legal technology, encouraging widespread adoption of certain technologies that may later act as a springboard for future technology advancement. The focus for this phase, which should start taking place over an estimated 18 months, will be on achieving a baseline level of productivity and communications capabilities for lawyering in the digital age.

21. The second prong focuses on identifying *enhancements* and improvements to baseline legal technologies as driven by the needs of the legal sector. Under this phase, for which visible results are expected to start appearing in approximately two to three years, a broader and more sophisticated demography of lawyers will play a crucial role in helping the Singapore legal sector ramp up its capacity for providing next-generation legal services. It should be clarified that the enhancements and improvements that are sought under this prong should represent a significant improvement over the baseline; we are not after minor incremental improvements to the services that should continue to be delivered through regular updates.

22. The third prong is a veritable crystal ball: a process to engage stakeholders in identifying technologies which are speculative or even unknown today, out of which prototypes will be put through the phases of proof-of-concept and test-bedding, with the aim that new legal technology solutions will be adapted from the existing state-of-the-art, and perhaps even applied to the legal industry. The process can start now, but public betas for technologies under this phase are expected to go live in the three-to-five-year time frame.

23. The fourth prong has no fixed time frame, and focuses on the *landscape* of legal technology, as opposed to specific technological products or services. The goal under this prong is the incentivisation and acceleration of an ecosystem that is conducive to the development of legal technology solutions in Singapore. With careful nurturing of such an ecosystem, through for example the provision of networking platforms, the setting up of a task force, as well as engagement with universities and venture capital investors, it may be possible for Singapore providers (whether for legal services or legal technology) to export truly disruptive inventions and expertise to regional markets. In this connection, much will also depend on progress in the local technology sector itself. For example, the Infocomm Media 2025 Master Plan was issued to spur the creation of a globally competitive infocomm media ecosystem through social and economic transformation and the promulgation of road maps for manpower development, technology and research and development, while the Cybersecurity Strategy sets out the nation's commitment to resilient cyber infrastructure and the development of a vibrant cybersecurity ecosystem. Developments such as these will go a long way towards growing legal technology and related services.

24. The four-pronged approach described above may be summarised as the $(AI)^2$ model. ***Adoption*** of existing technology takes place at the baseline stage, followed by ***Improvements*** to existing technology resulting in enhanced services. Thereafter, ***Adaptation*** of the state-of-the-art allows for the production of truly innovative services. Finally, legal technology acceleration provides a vibrant legal technology ecosystem permitting the ***Invention*** of truly innovative legal technologies.

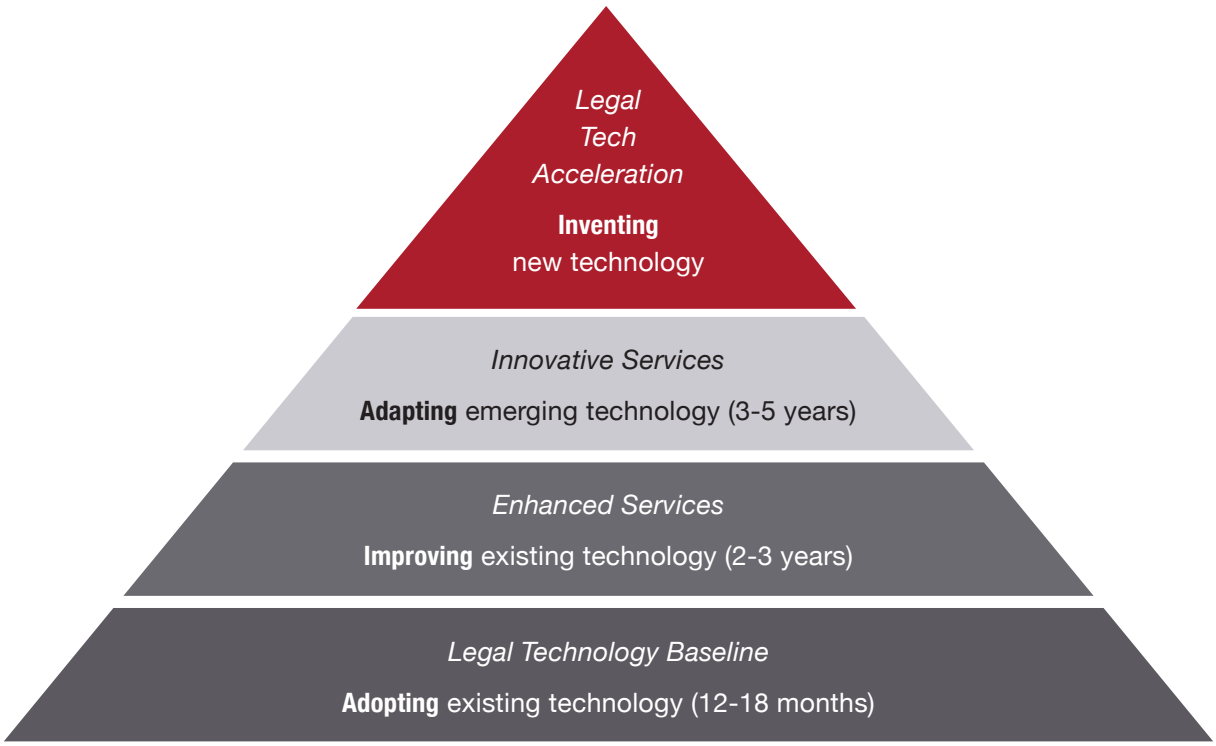


Figure 1: Approach of the Legal Technology Vision The (AI)^2 Model

The Development of the Vision

25. The Vision was crafted in close consultation with stakeholders in the legal industry, with an eye on technologies outside Singapore. The Legal Technology Vision Working Group members are found in **Annex A**. Under the direction of the Legal Technology Cluster Committee Chairman, preparations for this Vision began with a literature survey of developing legal technology trends and technology adoption in other jurisdictions, as well as focus group sessions with legal practitioners and in-house counsel. Technology providers were also invited to give Committee members and stakeholders some updates on technology developments and trends affecting the industry. All these culminated in a full-day retreat on 9 May 2016, where participants from various quarters provided ideas and input into what would go into this Vision (the list of retreat participants is found in **Annex B**). The ideas garnered from the retreat were synthesised and a framework constructed before drafting commenced. Throughout the drafting process, key stakeholders, including the Law Society, government agencies, legal professionals, and technology providers, were constantly engaged to ensure that the Vision would be relevant and achievable (the full list of participants in the consultation process is also found in **Annex B**). The Working Group acknowledges that these contributions have been invaluable in formulating the key ingredients of this Vision.

About the Legal Technology Cluster Committee

26. The Singapore Academy of Law's Legal Technology Cluster Committee traces its roots to the LawNet Council that was formed in 1990 – which became the LawNet Management Committee in 1995 – and the Electronic Litigation Committee that commenced in 2005. Amalgamating these two committees as part of the Academy's reorganisation in 2015 to focus on its new role as a promotion and development agency, the Legal Technology Cluster Committee was established with the following terms of reference:

(a) Set global objectives and policy guidelines for the promotion, adoption and development of technology to enhance the efficiency and capabilities of the legal sector and to cement Singapore as a legal hub;

(b) Study and periodically scan the horizon for technology relevant to the legal sector for adoption;

(c) Superintend the adoption and development of technologies by the Judiciary and LawNet for use in the litigation process;

(d) Appoint working groups for specific projects within the Legal Technology Cluster and set objectives for, provide policy to, approve work plans and proposals of and review the progress of, the working groups; and

(e) Carry out such other duties as may be assigned by the Senate or Executive Board.

27. The Committee is the paramount steering committee that is responsible for driving the adoption of infocomm media technology in the legal sector and works through stakeholders in both the public sector and private industry. This Vision therefore falls squarely into the core ambit of the Committee's work: as indicated above at paragraph 12, it is addressed primarily to the profession in private practice and private sector in-house legal departments, and to legal technology solution providers operating in or from Singapore. The rationale for this Legal Technology Vision has also been expressed in paragraphs 16 to 18 above: it is a clarion call to the legal profession to harness infocomm media technology and channel its potential for disruption towards creating innovative legal technology solutions that will improve the delivery of legal services to clients both local and abroad. For the legal sector in Singapore, the prevailing view is that it is preferable to take the lead in the impending disruption rather than to be buffeted by the winds of change.

28. This Vision is a break from the past where the Committee (in its earlier incarnations) had focused primarily on shepherding public sector law departments in concert with the government's computerisation efforts. The momentum of earlier and continuous public sector computerisation efforts will continue to propel public sector law departments to move ever forward in the adoption of legal technology. The Committee will continue to perform its traditional role in the public sector but with this Vision, it is looking to co-ordinate various public, private and collaborative initiatives that will lead to the transformation of the legal industry's adoption of infocomm media technology and the creation of legal technology solutions.

29. To this end, the Legal Technology Cluster Committee will continue to work with law departments in the public sector to dovetail their plans in support of the objectives articulated in this Vision. The Ministry of Law will continue to set policy for the legal industry and will therefore play a crucial role in us achieving the vision of being a technology-enabled legal hub. The Academy and the Ministry of Law will work together to co-ordinate the implementation of this Vision.

30. There are also many other future-proofing initiatives presently being rolled out by various stakeholders in the legal community, including the joint Courts of the Future initiative by the Judiciary, the Law Society's Legal Industry Transformation Programme and the IT Vision of the Attorney-General's Chambers. The Legal Technology Vision is therefore but one piece of the complex jigsaw that is law and technology, and it is hoped that it will do its part – in tandem with all the other pieces – to help prevent the opportunities yielded by innovation from slipping through the cracks.

> “... the baseline is essential because it is the springboard for all future technology advancements.”

Chapter 2: Achieving Adoption of a Baseline Set of Legal Technology

31. Given the non-homogenous nature of the legal sector, it is not surprising that the level of technology adopted by each lawyer can differ greatly. Factors such as the age of the lawyer, his receptiveness to change, the practice group he belongs to, or the size of his law firm all contribute to this wide variation. In order to map out how legal technology should advance in the next five years, it is essential as a first step to define the baseline suite of technologies. This chapter will thus focus on the baseline of productivity and communications capabilities for lawyering in the digital age.

32. The importance of defining a baseline suite of technologies is three-fold. Firstly, clear technology adoption standards serve a signalling function across the legal sector as to the minimum standard of skill which all lawyers should possess in order to make use of infocomm media technologies. Secondly, it underscores that most Singapore lawyers should be discoverable online through their professional corporate and personal online profiles, and should be able to communicate and collaborate with clients electronically. While most Singapore lawyers are already infocomm media-savvy and mobile, operate with ease in a digital environment, and handle cross-border matters capably, the baseline acts as a compass for those lagging behind. Finally, for public agencies rolling out new digital services, the baseline allows them to make design assumptions as to the appropriate services for the legal sector at this point in time. In short, the baseline is essential because it is the springboard for all future technology advancements.

For Whom the Baseline is Drawn

33. The target group for this baseline are law practices (or legal departments) with more than one or two fee-earners but less than a hundred. The rationale behind such a choice is as follows: the largest firms (defined as those with more than a hundred fee-earners), can be excluded because their greater resources and drive to remain competitive generally mean that they are able to keep up with improvements in legal technology on their own. Nonetheless, the baseline remains useful with regard to large firms as it is likely to spur them to maintain standards which are a comfortable margin above the baseline. On the other end of the spectrum, the profile of some practitioners in the smallest solo practice or two-man partnerships posit that there are some habits and practices that are too inveterate to be changed. However, it does not mean that the smallest law practices that are sufficiently motivated will be excluded. On the contrary, there are plans to groom motivated sole proprietors to practise in a modern electronic and paper-light law office. It should be emphasised that this Vision is an inclusive one that will provide assistance to all who are willing to adopt modern means of managing their practice. In the final analysis, it is necessary to identify a target group as one of the objectives of this Vision is to encourage legal technology providers to better tailor their offerings to this group and to offer complete solution suites if possible.

Establishing the Baseline

34. Baseline expectations should be kept at a basic level, with more advanced technologies to be introduced in the other prongs of the Legal Technology Vision. At the same time, since the targeted timeline for the initial adoption milestone of the baseline is approximately 12 months, settling on the lowest common denominator would be an uninspired way of defining the baseline. Therefore, it is imperative that a slight "stretch" element be incorporated in order to ensure that practitioners will be edged to step out of their current comfort zone.

35. As discussed earlier, the focus of the baseline is on technologies that improve lawyers' productivity and communications capabilities. The difficulty with setting a common baseline, however, lies in the fact that lawyers in different fields and age groups may have different needs and perspectives in respect of technology. Even within technologically-conversant groups of lawyers, some will naturally be early adopters while others will lag behind. To complicate things further, technological solutions may come in different forms for different practice areas. Areas where technology is ripe for exploitation would include litigation and conveyancing practices. However, for other areas, it is less clear how technological solutions will look like (*eg* it may not be ideal for lawyers practising community law to communicate solely via email or video link given that their clients usually want face time with them).

36. Nonetheless, it is possible to identify seven categories of technologies that are basic enough to apply to all firms, regardless of their circumstances. Not all the infocomm media technologies that are identified for the purposes of baseline adoption are, strictly speaking, legal technology solutions since the majority are productivity and communications solutions that are found in many modern offices. The table below thus sets out the categories of technologies which all lawyers are expected to adopt as a baseline, along with more specific examples of such technologies:

Category	Examples
Office productivity suites	Office 365
Time logging and billing systems	Intapp, Elite Billing Manager
Practice management system	Client management systems, conflict check systems
Online profile	Lawyer's individual profile on LinkedIn, law firm's website
Communications	Video conferencing (eg Skype), email
Cybersecurity	End-point antivirus and firewalls; and server-side hardware based firewalls
Legal research	LawNet

Table 1: Categories of Baseline Technologies

37. The baseline suite of technologies may necessarily have to accommodate variations according to the lawyer's area of practice. In finalising the baseline, it will be necessary to include additional systems, for example, the Judiciary's eLitigation system for litigation practitioners and InteReq for

conveyancing practitioners. It should additionally take into account pertinent future developments to ensure that practitioners are able to participate in them, for example, the Judiciary's Courts of the Future initiatives. Taking into account the varying levels of technology adoption across the legal sector, a single adoption milestone would not be ideal. The adoption of the baseline may have to be carried out in multiple phases: for example, 65% adoption by the industry by the end of 12 months, 75% adoption by the end of 24 months, and 85% adoption by the end of 36 months. The precise adoption milestones should be finalised at the implementation stage after conducting an initial survey to determine the adoption rates at commencement.

Achieving the Baseline

38. Having defined the baseline standards, it is important to next consider how those adoption milestones can be met. Since law firms are essentially revenue-driven, any push for the adoption of legal technology solutions needs to present a value proposition for the law firm, and subsequently for its clients. In other words, the adoption of legal technology should lead to a more effective legal practice that is consequently able to pass on the cost savings and efficiencies borne of legal technology to the ultimate beneficiary – the client. In this regard, we propose several strategies which cover crucial aspects such as the cost of implementation and the framework to support law firms' adoption of the baseline.

Addressing the Costs of Adoption

39. The first strategy in this aspect concerns measures to lower the cost of adoption. This can be done in several ways:

(a) Developing an online suite of legal technology solutions for the entire legal sector. In return, all subscribing law firms contribute a volume-based fee which can be dependent on, for example, the number of fee-earners in the firm, the firm's case load and usage of the system, the number of live accounts maintained by the law firm, *etc*. However, the disadvantage of this option is the significant initial funding that will be required to develop or to assemble this suite of services. Another pertinent consideration is the lack of economies of scale, given Singapore's relatively small legal sector, resulting in an assembly of solutions that may not provide the best of breed suite of services. On the other hand, if all that is sought is a rudimentary set of services – this is a baseline after all – this approach may ensure that a basic set of features is available at an affordable cost and law practices that outgrow the solutions can move on to make use of commercial off-the-shelf solutions.

(b) A second possibility is for legal firms to band together to engage the services of a middleman. A model for this is the Law Society's pilot scheme to assist law firms in the selection of infocomm media technologies provided by selected partner vendors. This step creates a list of technologies (*eg* that are secure and acceptable for use) reviewed by the Law Society so that

law firms have some measure of assurance when adopting them. This approach can better ensure that the best of breed solutions from partner vendors are selected for inclusion in the programme, with the list of participating solutions reviewed periodically. In addition, this approach makes use of demand aggregation to drive down the price and costs of adoption.

(c) On the related point of provision of support for baseline legal technology, both the online suite and demand aggregation models can also form a market for shared corporate backroom services, *eg* a common IT helpdesk or even common managed services. For smaller firms, resource sharing for backroom operations would make more sense economically since they are unlikely to require permanent in-house support.

40. The second proposed strategy is to make better use of available productivity, technology promotion and other government grants which can incentivise the adoption of baseline legal technology. This involves a two-pronged approach. The first prong entails raising awareness amongst law firms regarding various grants and reliefs, *eg* the Productivity and Innovation Credit Scheme ("PIC scheme") which gives 400% in tax deductions/allowances for qualifying activities such as the acquisition of IT equipment. On the other side, it is also important to collaborate with the government agencies disbursing grants (*eg* SPRING Singapore) to increase their understanding of the legal profession, since law firms operate in a different manner from most companies, and in so doing, craft performance outcomes that are appropriate for law firms. In this regard, the ambitions of this Vision are intended to dovetail and integrate with the Law Society's ongoing efforts in this area.

Getting the Best out of that Purchase Decision

41. In order to ensure that baseline legal technologies are successfully adopted, it is crucial that these technological solutions not only be purchased but used effectively. This next section discusses the following areas:

(a) First, the overall level of infocomm media technology literacy – *viz* the comfort and facility in using infocomm media technology generally – has to be raised.

(b) Next, specific knowledge of legal technology solutions that are pertinent to different practice areas have to be acquired. This includes both the general knowledge of the state of legal technology solutions in the practice area concerned, as well as training to use specific solutions effectively.

(c) After the decision to buy, it is vitally important that the legal technology solution be implemented within a law firm in a way that will maximise its use. This requires that existing processes be reviewed and, if necessary, be changed.

(d) Apart from this, internal policies may have to be adopted to set out more efficient workflows that will reap for the law firm the most bang for its buck.

(e) Finally, dispelling any fear, uncertainty or doubt over the use of legal technology solutions that may be presented by antiquated rules and regulations or practice directions – and more often than not, it is the antiquated *interpretation* or *misunderstanding* of otherwise neutral regulations or practice directions that needs to be addressed.

Integration with Competency Programme and Other Forms of Training

42. To raise the bar for general infocomm media literacy and to improve competence in legal technology generally, legal technology competency should be integrated as part of the general continuing legal education framework.

43. To this end, the Academy will ensure that both infocomm media literacy and legal technology competency will be incorporated in its Legal Industry Framework for Training and Education ("LIFTED"). At the initial stage, this framework will concentrate on training law practice staff and lawyers to use a baseline suite of legal technology solutions. The Academy's competency programme will offer basic proficiency certification in the legal technology solutions that make up the baseline suite; the baseline suite should fully coincide with the Academy's Modular Training (which may include relevant SkillsFuture courses). A pathway to build competencies leading to baseline competence certification can also be established on the basis of 18-, 24- and 36-month time frames. As one progresses up the competency ladder, more advanced training for legal technology solutions pertinent to different areas of practice, *eg* evidence management and trial presentation, can be offered. The design of such courses depends on the maturity of the technology. If a solution has sufficient complexity and maturity, courses taken in relation to that solution can correspond to the LIFTED framework and lead to the award of specialist certificates. Conversely, if the solution is still developing, training can be undertaken with a focus on equipping the user with the basic knowledge to use and adopt it.

44. Secondly, the law schools and polytechnics should ensure that their courses are designed to train students adequately in commonly used business tools (such as practice management systems, time billing and logging systems). This may be achieved not necessarily through a specialist course, but by setting parameters for course design for existing courses which require these skills to be applied repetitively. The Academy can work collaboratively with the educational institutions to provide the necessary instructional design inputs and even customised versions of the baseline courses for their students.

45. Finally, it is important that competency takes care of the bleeding edge, where the cutting edge of infocomm media technology meets legal practice. More of this discussion will take place in the later chapters, but in the present context, the competency programme will have to ensure that there are occasions for the discussion of how new infocomm media technologies can have an impact of legal practice, and for the discussion to progress towards how these technologies may be adapted to provide "Legal Tech" solutions.

Getting the Most out of that Purchase

46. Apart from training, assistance will also be provided for law firms to make an informed decision about which legal technology solution to adopt. Generally, assistance will take the form of product reviews and comparisons (which will be curated and reviewed to ensure objectivity), along with case studies and sharing of experiences and best practices. These can take the form of reviews and articles published in magazines and newsletters (*eg* Law Society's Singapore Law Gazette and the Academy's ed:VANTAGE) or, if there are adequate contributions, a dedicated annual technology guide. However, for a more hands-on option, seminars or workshops can also be conducted by the Law Society and the Academy.

47. Past the initial adoption, the support framework will need to extend to assisting law firms to maximise their investment in Legal Tech solutions that they have purchased. This can take several forms:

    (a) Providing assistance in the form of a review of existing workflows in order to see how these may be adjusted so that they can become more efficient. This produces a customised solution but may not be necessary for the simpler or more typical workflows.

    (b) Providing template workflows for fairly standard processes within a law firm. For example, the opening of new files or receipt of documents from clients. These templates are effectively best practices that law firms can adopt wholesale or in part.

    (c) Sharing case studies and best practices for organising the interaction with clients. This is an area that infocomm media technology can assist. There are many interactions between lawyer and client (who may be corporate counsel), such as keeping the client informed of correspondence with opposing counsel, the Courts or experts during litigation. The use of online folders, where a copy of the correspondence is deposited into a set of folders that is shared with and accessible by the client, may reduce the time and effort spent in ensuring that clients are kept updated.

48. At the same time, emphasis should also be placed on identifying outdated rules and regulations or practice directions that are perceived to hinder either the adoption of legal technology solutions or the effective use of legal technology solutions and move to updating them so that they properly take into account new technologies and not unintentionally hinder their use. This is an area that the Law Society's Technology Committee can study, in consultation with the Ministry of Law and the Professional Conduct Council.

Ensuring that We All Get Along

49. With a baseline suite of legal technology solutions that may possibly come from different partner vendors, it is important that data is easily portable and transferable among them. This is the least that the modern user expects. The more advanced user may even expect that the legal technology solutions – particularly those that are online – be able to interoperate with each other, for example, having data flow from the practice management system to the time-keeping and billing system and also integrating with the online collaborative workspace. In specific practice areas where the lawyer needs to use an e-service from a public agency, *eg* the Judiciary's eLitigation or Integrated Criminal Case Filing and Management System ("ICMS"), the expectation is to be able to connect through Application Programming Interfaces ("APIs").

50. To this end, a set of open data standards should be articulated to ensure portability of data and to pave the way for the level of interoperability expected. As a starting point, the Academy can look to commence work on setting data standards for the establishment of a common interchange format (*eg* LegalXML). This effort should dovetail with parallel efforts in the public sector to ensure that data is portable, and would lay the foundation for exploring interoperability between the private and public sectors through API connectivity in the future.

> “... the new or enhanced services described ... are conceived as answers to feedback received from users or to address hitherto unmet demand.”

Chapter 3: Improvements to Serve the Legal Industry

51. Beyond the basic suite of services identified in our baseline, there are many other ways in which technology can be harnessed to improve and simplify processes. The establishment of a baseline level of legal technology adoption in the industry will pave the way for the introduction of an enhanced suite of products and services that practitioners can exploit to bring a competitive edge to their legal practice. In-house or corporate counsel will also welcome the cost savings and efficiencies gained from a more intensive and advanced use of Legal Tech, both from the perspective of adoption within their legal department and as buyers looking out for more cost effective and innovative legal services.

52. An enhanced level of legal technology services will cater to more technologically savvy users in the industry who recognise the benefits that technology brings. This group of users will be ready to exploit the benefits of Legal Tech as a competitive advantage in the delivery of legal services. To this end, the majority of the new or enhanced services described in this chapter are conceived as answers to feedback received from users or to address hitherto unmet demand. The other characteristic is that these are services that offer significant improvements to existing LawNet services or new services. Existing LawNet subscribers should rest assured that incremental improvements to LawNet services will be introduced progressively and regularly.

53. We also expect that the pool of technologically savvy users will increase over the years as (a) competency in Legal Tech is built up through efforts in training the legal industry and (b) more practitioners realise the efficiency benefits and cost-savings that the use of Legal Tech can bring to their practice. Perhaps the more ambitious and strategic goal is that practitioners and corporate counsel alike will look towards the adoption of Legal Tech solutions as a means of ensuring the quality of their services in the face of increasing downward pressures on legal costs, and as a force multiplier by enabling them to compete with larger players.

54. We expect that some of the services described in this chapter will start making their appearance as enhancements to existing services or as new services offered in collaboration with existing Legal Tech solutions – in particular, LawNet – within a *two-to-three-year* time frame. At the end of this time frame, a significant milestone should have been met in the legal industry's adoption of the common baseline of products and services and achievement of a basic competency in Legal Tech. It is vital to stress that it is neither possible nor ideal for these services to be delivered entirely by LawNet. Instead, it is in the interest of LawNet to work with providers of existing or new Legal Tech solutions so as to develop the Legal Tech industry. In order to provide the level of user experience and integration that the modern user expects, it is necessary that a set of common data standards should also be developed, enabling the Legal Tech solutions to offer a greater level of integration.

An Overview of Possible Improvements

55. An enhanced level of Legal Tech products and services would come either in the form of improved versions of current services such as those found on LawNet, or as completely new products and services developed specifically for legal practitioners. Outlined below are a number of enhanced or new services that could be offered as part of an "enhanced" suite of Legal Tech services. To be clear, these are the synthesis of a variety of ideas that were developed over the course of the Legal Technology Vision Retreat held in May 2016, and in conversations with different focus groups, stakeholders and other interested parties in the lead up to the Retreat and in its aftermath, including engagements in the finalisation of this Vision. Further work is still required to properly scope these improvements as we move towards implementation.

Improving Collaboration

56. The advance of online collaboration tools is envisaged to change the way lawyers interact with their clients, *eg* keeping them updated on correspondence, the progress of their matter, working on drafts of documents like affidavits and contracts. This section describes a set of tools that is conceptualised to allow certain common interactions between lawyer and client to be carried out online.

Shared Workspaces

57. The ability to store documents on the cloud today creates tremendous opportunities for lawyers to collaborate real-time with each other and with clients from virtually any place in the world. A cloud-based document management system ("DMS") should be developed in order to enable lawyers to bring their workflow completely online, increasing the speed and convenience in the delivery of legal services. This will enable lawyers and clients to work real-time on the same document in an interactive setting, minimising the need for drafts to be sent back and forth. The DMS could automatically notify a client once a draft document has been uploaded by the lawyer into the cloud for his review.

58. We note that concerns over data security on a cloud platform may possibly discourage firms from subscribing to a cloud-based DMS. Similarly, concerns and/or ambiguity over whether client information can be stored on the cloud may hinder its adoption. One possible option is for the data to be hosted on a private cloud instead of a public cloud. This will allow the firm to control the security of the data and ensure that the servers that host the data remain within jurisdiction. However, this will reduce the benefits in both costs and scalability that cloud technology offers.

59. To some extent, these concerns may be ameliorated if a common platform is made available through LawNet to the profession, addressing these issues through aggregation of demand. With LawNet's participation in the development and operation of the platform, more practitioners can be assured about the reliability and security of the system. This also provides the platform for the development of other online tools and services described in this section. LawNet could, in its selection of platform,

provide a *de facto* standard and basis for comparison for law firms looking to benchmark their own system acquisitions. Room should also be given for larger law firms or law firms that are part of global networks to leverage off resources that they have access to.

60. In addition to common *online* workspaces, shared *offline* environments may also produce synergies that may benefit stakeholders. For example, a physical space in which various small law practices and technology firms are co-located may not only facilitate the implementation of extant legal technology solutions (such as shared billing software modules), but also the fermentation of new ideas borne of the feedback loops within the common physical environment.

Document Review Tools

61. Enhanced document review tools should be developed and included as a feature on the cloud-based DMS. The document review system should be able to assist practitioners in creating a chronology of events based on the documentary chain that have been uploaded on the platform. There should also be a function to allow users to tag documents according to customisable tags, *eg* subject type, source and content. In the future, technology-assisted review tools that make use of machine-learning technology can also be employed such that the system can suggest tags for the user based on how previous documents were parsed and tagged. The document review tool should also allow the lawyer to view different collections of documents according to how they have been tagged, and generate data that can be exported for use on other platforms. The availability of this document review and tagging tool can be utilised in a variety of ways, ranging from managing contractual precedents, documentary evidence for a litigation matter, past advice on specific legal issues, *etc*.

Document Assembly

62. Document assembly tools can also be provided on the shared workspace for the preparation of standard contractual documents and affidavits. The use of such tools can allow law firms or legal departments to ensure consistency in quality, and potentially change the way work is now organised between lawyer and client. In lieu of the usual process of interview, drafting of affidavit and thereafter multiple rounds of review, it may be possible (especially for routine affidavits) for the client to access and walk through the online document assembly tool which will then generate the first draft. This can reduce the time and interaction required to prepare such documents. The same approach may also be adopted for preparation of fairly standard contracts, *eg* tenancy agreements, wills, *etc*. In future, it will also be possible to improve this tool by tapping on a database of past similar contracts and making use of machine learning technology. An idea that could be explored is the ability to analyse a new draft of a contract against its precedent database of similar contracts to identify clauses that deviate from standard clauses and their degree of deviation.

Online Swearing or Affirmation of Affidavits

63. Today, deponents are required to attend physically before a Commissioner for Oaths or Notary Public ("CONP") whenever an affidavit needs to be sworn, affirmed or notarised. The requirement for physical presence allows the CONP to verify identity and ensure that the deponent understands the document. For the occasional deponent, this may be seen as a minor inconvenience or irritation. For some commercial corporations or even law firm employees like service clerks who swear, affirm or notarise affidavits on a more regular basis, a more efficient solution can be devised.

64. Instead of requiring a deponent's physical attendance before a CONP, it is possible to make use of digital certificates to authenticate a deponent's identity, utilise video conferencing technology to establish their understanding of the contents, and to allow them to append their digital signature to the document completely online. While an earlier attempt in the Judiciary's Electronic Filing System was piloted, this was abandoned due to limitations of both infocomm media technology at that time and the readiness of the profession. A decade has since passed and the lessons learnt from that earlier pilot can be harnessed in this second attempt.

65. One of the challenges back then was the availability of a digital certificate for every citizen or resident. Until this is addressed through a national effort to provide every citizen or resident a means of authenticating their identity online, it is possible to make a more focused second attempt. The initial phase for such a service can be targeted at deponents who frequently swear or affirm affidavits, *eg* law firm filing clerks, companies engaged in high volume debt collection litigation, *etc*. In time, as CONPs and deponents become more familiar with the process of e-authentication and e-notarisation, and as the practical benefits of the system come to be widely understood (for example, cost and time savings on face-to-face meetings for the swearing or affirming of affidavits), we can expect greater adoption.

Improving Access to Legal Services

66. Today, online directories of lawyers and/or law firms predominantly facilitate a one-way provision of information from law firms. Developments in the restaurant and hotel booking space have demonstrated the relevance of a new type of online intermediary that provides a platform to match supply and demand. These ideas have more recently been taken another step further by platforms for the sharing economy (*eg* Uber and Airbnb). The discovery of legal practitioners and provision of access to legal services has thus far been relatively conservative, relying on traditional online searches, professional social networking sites and, predominantly, word-of-mouth recommendations.

67. The appearance of virtual marketplaces for legal services, such as **Asia Law Network** ("ALN"), bring interesting possibilities. ALN is a portal facilitating the discovery of legal services providers, and allows for interested users to obtain a consultation or a quotation. Such platforms could be useful to consumers of legal services who need to find suitable lawyers to help them with their business or other personal legal matters. Taking a leaf from other demand and supply matching online portals, features that allow clients to provide feedback, information and ratings about the legal services they receive can be explored. The importation of such features will have to be studied carefully since professional requirements and the need for independence of legal advice do often result in advice that clients may not wish to hear and thus may not immediately rate favourably. However, there may be positive benefits in providing a ratings system that provides fair and reasoned feedback on the provision of legal advice, in promoting greater transparency as to access to legal services. These are issues that have to be considered in greater depth during the implementation phase.

68. Subject to proper supervision and curation, a virtual marketplace could also borrow ideas from sharing economies that provide opportunities for lawyers to find other lawyers to work together on a particular project. The concept is not dissimilar to declaring the free time of your apartment or your car, except that in the context of the provision of legal services, the capacity to take on additional work is not tied to an asset (like an apartment or car) but to the lawyer's work load. It is nevertheless possible to explore the possibility of enabling lawyers with a project on hand but requiring help to discover other lawyers with the requisite experience and who have declared their ability to take on additional work. It is the matching of experience and availability between lawyers. This can potentially change the way lawyers, particularly those in solo or smaller practices, work. The virtual marketplace could also act as a platform for smaller sized practices to partner and collaborate together with other practices for larger deals or cases that they may not be able to handle alone. This paves the way for a new generation of lawyers who may operate mostly online and out of their home offices and co-working spaces. To facilitate this, the rules regarding collaboration between practitioners may have to be clarified for the models of collaboration that may develop. In addition, rules may also have to be adapted or established concerning the publicity surrounding and advertisement of legal services on these virtual marketplaces.

Improving Access to Legal Knowledge

A Contract Database by Lawyers for Lawyers

69. Currently, there is no reliable and affordable external database of contract templates and precedents that corporate and in-house counsel can tap upon when drafting new contracts. While larger law firms may be able to maintain their own internal database, smaller outfits and in-house counsel usually have to spend much time reinventing the wheel. There are efficiencies that can be gained if these lawyers were to share their contract templates and precedents with one another, regardless of whether their firms utilise the latest in electronic document management systems or simple folders in Microsoft Windows. Through the years, this has also been an area where there have been constant requests.

70. The sharing of contract precedents can borrow from concepts in the open source software community. Basically, if a user has made changes to the contract precedent, he should contribute his changes back to the community. It is possible to mesh these ideas with a Wikipedia-style online database of contract precedent and document templates, where practitioners will be invited to contribute the legal documents they had previously drafted to the database (with appropriate redaction). These drafts can be used and improved upon by other lawyers, who will then be invited to provide their version of the document, if they have made changes to it.

71. To encourage sharing by lawyers, the platform could incentivise lawyers who contribute on a regular basis through credits for access. The platform could also be used for peer review and ratings of uploaded documents, and top-quality precedents could be highlighted and explicitly recognised on the platform, creating positive publicity for the law firm and/or lawyer. Participation by corporate counsel on such a platform will bring with it two-fold benefits: they will be able to tap on and benefit from the contractual precedents, and legal practitioners may be incentivised to contribute both actively and positively in order to establish their expertise and experience in their area of practice (in much the same way that present-day case highlights and update newsletters help establish the credentials of the law firms preparing them).

72. In considering this potential new service, a feature that allows a contract to be compared with relevant contract precedents can be considered. **LawGeex** performs a substantive review of contracts. It allows the user to simply upload a document, which is then compared against a database of similar contracts. The program then flags unusual or missing clauses which the user can consider. While the document uploaded does not form part of the database, statistical information about the document is stored and used to refine the accuracy of the system.[2]

---

[2] Zach Abramowitz, "More Evidence That Software Is Eating The Legal Industry: An Interview With LawGeex CEO Noory Bechor" <http://abovethelaw.com/2015/06/more-evidence-that-software-is-eating-the-legal-industry-an-interview-with-lawgeex-ceo-noory-bechor/>

Smarter Searches for Better Research

73. With the stabilisation of the LawNet Legal Research module, it is time to consider turning to the more advanced features in the search engine that powers the LawNet online legal research platform to improve search results and provide greater convenience to users. Today, search results on LawNet's legal research platform are solely dependent on the text that has been input in its search engine. The data captured regarding a user's search and use pattern can be analysed to produce more accurate and relevant search results. This can enable the search engine to suggest other relevant materials based on the reading pattern of a researcher. A visualisation tool can also be provided for the user to assess whether he wishes to read other related cases or materials. The LawNet legal research platform can also be integrated into the cloud-based DMS to allow for the auto-generation and updating of bundles of authorities. As more proven concepts and technology emerge through

further innovations in data analytics, additional functionalities can be added to the platform. These improvements are intended to pave the way for the more innovative use of predictive/prescriptive data analytics and machine learning technology that will be discussed in the following chapter.

Improving Connectivity to Public Sector Digital Services

74. With the development of LegalXML standards and potential growth in Legal Tech, LawNet could consider the possibility of developing an API exchange that will provide connectivity between Legal Tech solutions and the LawNet service with public sector digital services, for example, the Judiciary's e-filing systems like eLitigation and ICMS. The operational efficiencies that will result are obvious and need not be enumerated. A key motivation for this initiative is the potential cybersecurity issues that it can help to manage. As users demand greater connectivity of their Legal Tech systems and solutions with public sector digital services, public sector agencies are likely to have cybersecurity and system loading concerns with the exposure of APIs to too many systems. Channelling them through an exchange operated by LawNet can potentially strike the right balance between connectivity and cybersecurity.

75. There is a larger and more important role that this initiative involves. The Academy can coordinate between the Legal Tech community and public agencies, thereby facilitating discussions and the creation of standards necessary for the degree of interconnectivity that users expect. Thus, even if an API gateway turns out to be unnecessary or unfeasible, the contribution of this effort would have been to establish a standard that can then be adopted for similar transactions with other Legal Tech solutions.

Delivering Improvements

76. In order to deliver the enhanced and new services described above, cooperation between LawNet and other stakeholders is crucial, especially if improvements are expected to be seen in the two-to-three-year time frame. The following strategies are recommended:

    (a) **Partnership.** In order to deliver the improvements described in this chapter, the Academy will work with Legal Tech companies to adapt existing Legal Tech solutions. It is necessary for public-private partnerships to be struck to ensure a reasonable time to market. But more importantly, the Academy is not a commercial provider of Legal Tech solutions but its role is primarily to ensure the promotion and adoption of Legal Tech. While it may play a more active role in providing traditional legal research tools, the expanded scope and potential of Legal Tech requires that it focuses primarily on promoting the development of local Legal Tech companies.

(b) **Visibility.** Many practitioners today are slow to adopt new technology because they are not aware about them or because of risk-aversion. These issues will gradually be addressed as Legal Tech competency development efforts are intensified. In addition, to promote awareness of new Legal Tech solutions, the existing LawNet platform, which is familiar to legal practitioners, could be leveraged upon as a channel to deliver new and enhanced services, whether developed by LawNet or by Legal Tech partners. This will allow the use of LawNet as a platform to introduce new Legal Tech services and, through its familiarity, instil confidence among lawyers and encourage adoption. LawNet can be the figurative *tembusu* tree under which shade new services and/or technologies can be introduced but once the Legal Tech solutions become surer-footed, they should then venture much further afield.

(c) **Interoperability.** In order to minimise the costs and inconvenience of adoption, it is important that new Legal Tech solutions introduced be interoperable with other services on the LawNet platform and with each other. We expect that developers would be able to make use of API exchange and open data standards published by LawNet to develop new applications and software for the legal industry that are interoperable and compatible with private sector Legal Tech solutions, and existing platforms like LawNet and public sector digital services.

“
... the aim, ultimately, is to provide a constant throughput of innovative concepts ...
”

Chapter 4: Identifying Innovative Concepts

77. We have touched on the baseline suite of legal technology and the possible enhancements and improvements to these technologies; we now look beyond the existing solutions employed by the legal industry to explore the frontiers of science and technology. However, because some of these technologies are merely conceptual or even speculative, what is more important is that a *process* be put in place to engage stakeholders in the identification of such technologies, which are often developed in other fields, to be contextualised and adapted for the legal industry.

The Case for Public-Private Collaboration

78. Government-driven innovation has traditionally been centralised, monitored and top-down[3]. While it is not without its advantages, it may be less suited for the culture of open innovation that is envisioned for such advancements to take place. That is not to say there is no longer any role for a centrally-driven innovation program. The trend has been for government to move towards the role of incentiviser rather than project manager. For instance, Challenge.gov, an initiative of the White House, "seeks innovative solutions from the public [by] bringing the best ideas and talent together to solve mission-centric problems". It does so by way of challenge and prize competitions run by federal agencies. One example is the "Astronaut Glove Challenge", which invited innovators to design an improved, flexible glove for use by astronauts. The prize purse of US$450,000 was won by a start-up company, which has since signed an agreement with the National Aeronautics and Space Administration to develop and test spacesuit gloves.[4] At our own doorstep, the phenomenal growth of Fintech in the past 18 months has shown that a benevolent regulator who is actively engaged in cultivating this space can give the industry a leg up.[5]

79. Hence, we must go further – rather than merely providing incentives for innovation, the government can play the role of facilitator by providing the conditions that promote the cross-pollination of ideas between the infocomm media sector and the legal industry. This allows for the development of market-leading Legal Tech products and services through the identification of new technologies for the test-bedding and piloting of prototypes, for eventual introduction as new or enhanced services for the legal sector. This helps to tap on the potential to deliver value to clients, both in the traditional and broader sense, in new ways.

---

3 Stefan Lindegaard, "Any future for Government driven innovation?", ParisTech Review, 27 February 2015 <http://www.paristechreview.com/2015/02/27/government-driven-innovation/>

4 Rahim Kanani, "Incentivizing Innovation: How The White House Uses Challenge.gov To Solve Big Problems", Forbes, 17 February 2014 <http://www.forbes.com/sites/rahimkanani/2014/02/17/incentivizing-innovation-how-the-white-house-uses-challenge-gov-to-solve-big-problems/#5ab41bcc3e02>

5 Jamie Lee, "Singapore, the fintech prodigy", The Business Times, 29 October 2016 <http://www.businesstimes.com.sg/technology/singapore-the-fintech-prodigy?>

80. While the facilitative role of the government is expanded on in the next chapter, this chapter confines itself to public-private collaboration rather than enterprise-led initiatives. There is room for both and a healthy Legal Tech scene should indeed have both. There are some advantages to such an approach. First, because of Singapore's small size and correspondingly, the size of its legal industry, individual enterprises are unlikely to be able to attain sufficient critical mass to pursue truly ground-breaking innovation. A more centralised approach, in which both public and private sectors co-invest to fund research and development efforts that may then be reaped for the benefit of the legal industry at large, overcomes this limitation. Second, it provides an impetus that may be lacking in the legal industry if left to its own devices, given its conservatism. On a similar note, it may not be commercially viable for stakeholders to undertake such ventures, which are inherently high-risk and may reap no reward. A government-led approach ameliorates this risk while recognising that there is benefit in the mere acquisition of experience in working with new technologies, even where there is no end-product.

The Proposed Framework

81. The key proposal in this chapter is to convert a hitherto internal process into a transparent and open one. One of the key roles of LawNet over the decades has been to identify developing technologies and match them to challenges that face the legal sector, and in that process develop solutions and services. This had been a predominantly internal process but not wholly so. Representatives from the Bar are invited to join the committees and regular sessions to engage the Bar do take place at strategic junctures. This strategy is fine so long as the focus remains on improving LawNet services, or where the public agency is developing its digital services. As we turn our attention to the development of a Legal Tech sector, we have to adapt the playbook. The formula thus far adopted – horizon scanning to identify developing technologies, ideation to conceptualise solutions to identified challenges, proof of concept and test-bedding, and then production – will have to be adjusted by making it more transparent and open. *Transparent* in the sense that these hitherto internal processes will now be more exposed, and *open* in the sense that Legal Tech partners will have greater opportunities to collaborate. There will also be another key change, in that the challenges that are identified should now encompass challenges that are identified by law practices and legal departments. The conversion or adjustment process should take place even if the result is a Legal Tech solution that is intended to be implemented wholly in-house and in the private sector. Once the Legal Tech scene has gained sufficient momentum to carry itself forward, the identification of challenges to the legal sector and corresponding solutions may well occur in a more organic fashion, with transparency and openness built-in.

82. It is proposed that regular engagements, much like the Legal Technology Vision Retreat and the technology survey that was conducted in the lead-up thereto, be organised for discussing technology trends and identifying potential technologies that can be adapted for the legal sector. This can take the form of regular horizon scanning dovetailing with annual seminars and regular roundtables and/or workshops, and can be targeted at not just Legal Tech providers and start-ups, but tech-savvy lawyers and law practices that wish to make use of Legal Tech to distinguish their service offerings.

If such promising technologies can be identified and solutions conceptualised to solve real world problems, research and development funding can be obtained to move these concepts to prototypes in a systematic manner.

83. Because such solutions should avail to the legal industry at large, the aim, ultimately, is to provide a constant throughput of innovative concepts that are: (a) delivered as new or enhanced services on LawNet; or (b) developed as new Legal Tech solutions that are capable of interoperating with LawNet services.

Exploring the Possibilities

84. For the rest of this chapter, we look at two technology trends that have shown promise for deployment in the legal industry – data analytics and blockchain technology. They highlight the immense possibilities that lie ahead, though there is no guarantee that these ideas will move beyond the ideation stage. Each brings with it distinct hurdles that will have to be surmounted before an industry-wide implementation is adopted, which will only be considered after a feasibility assessment is undertaken during the operational planning stage. Nevertheless, these two trends have been identified to carry a strategic advantage that extends beyond the specific applications highlighted, and there may be benefits to embarking on such projects to develop the requisite know-how and experience that will enable Singapore to position itself as a thought-leader in Legal Tech. The framework for an open innovation process will be applied to the set of concepts and challenges described in the remainder of this chapter.

Data Analytics, Machine Learning and Natural Language Processing: An Introduction

85. Data analytics refers to "the extensive use of data, statistical and quantitative analysis, explanatory and predictive models, and fact-based management to drive decisions and actions".[6] Put simply, it is the drawing of conclusions and trends from data sets.

86. It has been estimated that by 2025, the total size of all the digital data created in the world will amount to 44 zettabytes (10^{21} bytes).[7] The explosion of digital data has opened up new avenues for the use of data analytics. This has led to the coining of the term "Big Data", which traditionally refers to data sets characterised by one or more of the following three features: volume (*ie*, extremely large data sets that traditional databases are unable to process at low latency), velocity (*ie*, data that is generated rapidly, even in real time) and variety (*ie*, diverse forms of data such as text, video, audio etc).[8]

---

6 Davenport, Thomas H, and Jeanne G Harris, *Competing on Analytics: the New Science of Winning*, Harvard Business School Press, p 7

7 Michael Kanellos, "152,000 Smart Devices Every Minute In 2025: IDC Outlines The Future of Smart Things", Forbes, 3 March 2016 <http://www.forbes.com/sites/michaelkanellos/2016/03/03/152000-smart-devices-every-minute-in-2025-idc-outlines-the-future-of-smart-things/#2392187969a7>

8 Andrew McAfee and Erik Brynjolfsson, "Big Data: The Management Revolution", Harvard Business Review, Ocober 2012 <https://hbr.org/2012/10/big-data-the-management-revolution>

87. The collection of massive amounts of data, both structured and unstructured, coupled with the use of advanced analytical techniques, allows us to gain tremendous insights into what would have been previously thought of as invaluable and/or unusable information. This can manifest in the form of previously undetected patterns that can shed light on potentially every facet of everyday life.

88. The types of analytics that can be performed with big data are potentially infinite, but can be placed in three categories:[9]

(a) Descriptive analytics – This is the traditional form of analytics. More often than not, it involves the application of filters before applying simple mathematical operations to condense the vast amounts of information into more easily understood information, which allow us to gain an insight into *what has happened*. This can range from information as basic as the number of "views" a YouTube video attracts to more detailed information such as a company's financial reports.

(b) Predictive analytics – It essentially involves the use of existing data to generate a model, which can then be extrapolated to predict likely outcomes in a given set of parameters. In other words, it uses data to predict data that is lacking.[10] This allows us to forecast *what could happen*.

(c) Prescriptive analytics – This is an evolution of predictive analytics. Instead of predicting a likely outcome based on one set of parameters, it involves multiple predictive models running in parallel based on different sets of parameters.[11] In a decision-making context, this allows the decision-maker to gain an insight as to *what should be done in order to obtain the best possible outcome*.

89. Naturally, it is the second and third of the above categories that have garnered the most interest in recent years. But these two categories of analytics require tremendous processing power, particularly if information must be gleaned in real-time. This is where machine learning comes in – a subset of artificial intelligence, it uses algorithms to parse data and learn from it without being explicitly programmed.[12] The term has come to be synonymous with predictive analytics but a distinction is drawn here: predictive/prescriptive analytics provides how big data can be used, while machine learning provides the technique to allow such use.[13] Within this subset of machine learning is the even smaller subset of Deep Learning. In Deep Learning, essentially, the machine is simply fed a learning algorithm together with great amounts of information. The machine then attributes different characteristics and draws its own connections in order to understand the data. In other words, the

---

9 Jeff Bertolucci, "Big Data Analytics: Descriptive Vs. Predictive Vs. Prescriptive", Information Week, 31 December 2013 <http://www.informationweek.com/big-data/big-data-analytics/big-data-analytics-descriptive-vs-predictive-vs-prescriptive/d/d-id/1113279>

10 Michael Wu, "Big Data Reduction 2: Understanding Predictive Analytics", 25 March 2013 <https://community.lithium.com/t5/Science-of-Social-blog/Big-Data-Reduction-2-Understanding-Predictive-Analytics/ba-p/79616>

11 Michael Wu, "Big Data Reduction 3: From Descriptive to Prescriptive", 10 April 2013 <https://community.lithium.com/t5/Science-of-Social-blog/Big-Data-Reduction-3-From-Descriptive-to-Prescriptive/ba-p/81556>

12 Michael Copeland, "What's the Difference Between Artificial Intelligence, Machine Learning, and Deep Learning?", 29 July 2016 <https://blogs.nvidia.com/blog/2016/07/29/whats-difference-artificial-intelligence-machine-learning-deep-learning-ai/>

13 Jeff Erhardt, "Machine Learning vs Predictive Analytics", 9 April 2015 <http://www.wise.io/blog/machine-learning-vs-predictive-analytics>

machine teaches itself.[14] The very nature of machine learning therefore marries perfectly with big data – not only is it designed to draw connections within large unmanageable amounts of data, but its performance improves as the data set grows larger.

90. Big Data and machine learning are already part of the here and now. In 2012, a group of researchers from Google created what was then "one of the largest neural networks for machine learning".[15] It fed the neural network 10 million digital images of cats, and it was able to teach itself (to a limited extent) how to recognise cats without ever being taught the concept of a cat. Since then, machine learning has found its way into less frivolous applications. For instance, YouTube now uses deep neural networks for an automatic "thumbnailer" to select the most attractive video still,[16] while Google's Smart Reply uses machine learning to generate possible replies to an email.[17] Facebook, which has already been using Deep Learning in its facial-recognition software with an accuracy of more than 97%,[18] recently announced DeepText, a "deep learning-based text understanding engine" which it claims "can understand with near-human accuracy the textual content of several [thousand] posts per second".[19] Machine learning has also helped spur advances in translation software[20] as

14 Roger Parloff, "Why Deep Learning is Suddenly Changing Your Life", Fortune, 28 September 2016 <http://fortune.com/ai-artificial-intelligence-deep-machine-learning/>
15 John Markoff, "How Many Computers to Identify a Cat? 16,000", The New York Times, 25 June 2012 <http://www.nytimes.com/2012/06/26/technology/in-a-big-network-of-computers-evidence-of-machine-learning.html?pagewanted=all>
16 Weilong Yang and Min-hsuan Tsai, "Improving YouTube video thumbnails with deep neural nets", 8 October 2015 <https://research.googleblog.com/2015/10/improving-youtube-video-thumbnails-with.html>
17 Frederic Lardinois, "Google brings its nifty Smart Reply Feature to Inbox on the web", 15 March 2016 <https://techcrunch.com/2016/03/15/google-brings-its-nifty-smart-reply-feature-to-inbox-on-the-web/>
18 Hannah Augur, "Deep Learning in 2016: Tech Giants Move to Share Data", 29 January 2016 <http://dataconomy.com/deep-learning-in-2016-tech-giants-move-to-share-data/>
19 Ahmad Abdulkader, Aparna Lakshmiratan and Joy Zhang, "Introducing DeepText: Facebook's text understanding engine", 1 June 2016 <https://code.facebook.com/posts/181565595577955/introducing-deeptext-facebook-s-text-understanding-engine/>
20 Quoc V Le and Mike Schuster, "A Neural Network for Machine Translation, at Production Scale", 27 September 2016 <https://research.googleblog.com/2016/09/a-neural-network-for-machine.html>

well as speech recognition.[21] IBM's Watson, which found itself in the limelight after demonstrating its natural language processing abilities in winning at Jeopardy! against human players in 2011,[22] has gone on to be incorporated into real-world applications in areas such as healthcare.

91. With these areas of technology increasingly finding their way into commercial enterprises, it is no surprise that the legal industry has started to look at exploiting such technology in the practice of law. While some of these projects are still in their infancy, they set out the possibilities as to how data analytics can help to advance a profession that has traditionally been resistant to change.

Legal Research and Knowledge Management

92. The technology that now allows us to not just identify words (written or otherwise) but extract the underlying meaning has great potential. Its most obvious application in the legal industry is to legal research. Traditionally, legal research has involved Boolean keyword searches – the user merely inputs words which generates results containing those words. Searches of this nature are often crude and imprecise. This is because these words generally represent a proxy for what the searcher is truly looking for. So a search for the word "home" would only return results containing the word "home", but omit results with words such as "residence", "house", "flat" or "condominium". On the other hand, if all the searcher is trying to do is to retrieve results relating to places of residence, the search may be over-inclusive by returning results such as "home run" or the Humanitarian Organization for Migration Economics (HOME). In addition, the modifiers that are used in Boolean searches – such as AND, OR or NOT – provide only a limited means of filtering results.

93. The limits of Boolean searches have been addressed to some extent by the traditional giants of the legal research industry, Lexis and Thomson Reuters, who have been incorporating natural language processing in their products. But it is **ROSS**, a system based on IBM's Watson engine, that provides a tantalising glimpse into the future. It utilises Watson's natural language processing abilities and machine learning to allow legal research to be done by way of queries in plain English in a manner that has been described as "[operating] more intuitively" than traditional legal research tools.[23] ROSS allows lawyers to ask questions in the manner that they would their colleagues. ROSS retrieves the relevant cases and highlights the key passages which set out the necessary propositions. More significantly, ROSS has the potential to get better with feedback. The legal industry has started to

---

[21] Allison Linn, "Historic Achievement: Microsoft researchers reach human parity in conversational speech recognition", 18 October 2016 <http://blogs.microsoft.com/next/2016/10/18/historic-achievement-microsoft-researchers-reach-human-parity-conversational-speech-recognition/#4ivaYkeXIzJRIWXu.99>

[22] Lauren J Young, "What has IBM Watson Been Up to Since Winning 'Jeopardy!" 5 Years Ago?", 5 April 2016" <https://www.inverse.com/article/13630-what-has-ibm-watson-been-up-to-since-winning-jeopardy-5-years-ago>

[23] Susan Beck, "Inside ROSS: What Artificial Intelligence Means for Your Firm", 28 September 2016 <http://www.capoliticalreview.com/capoliticalnewsandviews/computer-program-set-to-disrupt-legal-profession-ross-is-the-uber-for-attorneys/> and <http://www.law.com/sites/almstaff/2016/09/28/inside-ross-what-artificial-intelligence-means-for-your-firm/?slreturn=20161023012348>

catch on – ROSS cites Dentons, Latham & Watkins and BakerHostetler among its clients, albeit only in the field of insolvency and bankruptcy,[24] while Thomson Reuters has also begun collaborating with IBM to integrate Watson into its products.[25] However, ROSS has not been commercially released and there may be doubts that the body of local case law, rich as it may be, may not be sufficiently voluminous to "teach" ROSS.

94. In fact, a solution that is already on the market has gone one step further – **CARA**, a tool developed by Casetext powered by machine learning, completely sidesteps the search process in legal research. It analyses a legal document that is fed to it and generates a list of authorities which are relevant but have not been cited. It obviates the need for parties to key in search terms in respect of the issues raised and provides a powerful way of detecting weaknesses and omissions in legal documents. But it has its weaknesses. Because it relies on correlations between cases such as how often they are cited together, documents citing only new cases may not generate results that are as effective.[26] Another real-world application of data extraction is **Kira**, which is being used by Deloitte and is the subject of agreements with DLA Piper and Clifford Chance.[27] It uses machine learning to search large sets of unstructured data to identify concepts and clauses, which make it easier for a user to identify issues and trends across different documents. This has huge potential for in-house knowledge management.

95. The application of machine learning to online legal research is the next frontier for LawNet. However, the same technology can also be applied to in-house legal knowledge management, *eg* the management of contract precedents and legal advice. This is an area that the Academy can promote further research and development.

Outcome Assessment

96. The ability to predict the outcome of prospective litigation has far-reaching benefits, not just for legal practitioners and their clients but for the justice system as a whole. Not only do the lawyers preserve the interests of their client by dissuading him from undertaking litigation that is unlikely to succeed, but it protects the courts from buckling under large amounts of litigation, much of which may be unmeritorious.[28]

97. The derivation of data that can aid in determining the outcome of litigation is not entirely new. However, existing market solutions appear to be based on data extraction and analysis rather than

---

[24] Drew Hasselback, "Meet 'ROSS,' the bankruptcy robo-lawyer employed by some of the world's largest law firms", Financial Post, 9 August 2016 <http://business.financialpost.com/executive/smart-shift/meet-ross-the-bankruptcy-robo-lawyer-employed-by-some-of-the-worlds-largest-law-firms>

[25] "Thomson Reuters and IBM Collaborate to Deliver Watson Cognitive Computing Technology", 8 October 2015 <http://thomsonreuters.com/en/press-releases/2015/october/thomson-reuters-ibm-collaborate-to-deliver-watson-cognitive-computing-technology.html>

[26] Robert Ambrogi, "New Casetext Feature Finds Relevant Cases For You, But Along With It Will Come New Pricing", 18 July 2016 <http://www.lawsitesblog.com/2016/07/new-casetext-feature-finds-cases-along-will-come-new-pricing.html>

[27] Anna Ward, "Clifford Chance strikes deal with artificial intelligence provider Kira", 5 July 2016 <http://www.legalweek.com/sites/legalweek/2016/07/05/clifford-chance-strikes-deal-with-artificial-intelligence-provider-kira/>

[28] Jane Goodman-Delahunty *et al*, *Insightful or Wishful: Lawyer's Ability to Predict Case Outcomes* (2010) Psychology Public Policy, and Law 16(2) 133

true machine learning. As early as 2013, LexisNexis released the **Lexis Advance MedMal Navigator**. Described as a "powerful, one-stop solution for malpractice attorneys" that allow them to determine in 20 minutes whether a case is worth taking on,[29] it combines medical and legal content in a single product. Legal practitioners are able to access medical information used by doctors and hospitals, such as journals and images.[30] More significantly, it allows legal practitioners to assess the merits of their cases by retrieving verdicts and settlements from other similar cases.

98. **Lex Machina** goes further in generating an entire statistical database in the area of intellectual property litigation. It allows subscribers to retrieve a variety of statistics on the tendency of a party to settle, the success rate of a lawyer in patent litigation in a particular field and a judge's track record in deciding cases of a particular nature.[31] Such information can help parties to make decisions such as whether to press ahead with litigation and, at least in the United States, in which jurisdiction to pursue their case. Lex Machina employs machine learning techniques to identify legal concepts in the court documents that are publicly available, regardless of the words actually used. Lex Machina was acquired by LexisNexis late last year,[32] and its access to the latter's content will bring this technology to other areas of law.

99. Outcome assessment in the arena of civil and criminal litigation will be explored by the Judiciary as part of its Courts of the Future initiative. The Ministry of Law's Legal Aid Bureau is exploring the feasibility of building a program which can suggest a reasonable range to settle at for matrimonial asset disputes. The Intellectual Property Office of Singapore has also started applying analytics to patent data to derive insights into technology trends and help agencies in the making of R&D decisions. In addition, machine learning can be applied to trade mark and patent examination to supplement the work of examiners, and provide potential applicants with some indication of the likelihood of a successful application.

Online Dispute Resolution

100. The ability of systems to accurately assess such lower order variables has exciting potential in the field of online dispute resolution. The use of technology to assist in dispute resolution is far from novel: **eBay** encourages parties in particular types of disputes to resolve the matter between themselves through online negotiation, failing which parties present their arguments in an online discussion area to an eBay employee, who then adjudicates the dispute.

---

29 Joe Dysart, "How lawyers are mining the information mother lode for pricing, practice tips and predictions", ABA Journal, 1 May 2013 <http://www.abajournal.com/magazine/article/the_dawn_of_big_data/?utm_source=feedburner&utm_medium=feed&utm_campaign=ABA+Journal+Magazine+Storieshttp://www.abajournal.com/magazine/article/the_dawn_of_big_data/?utm_source=feedburner&utm_medium=feed&utm_campaign=ABA+Journal+Magazine+Stories>

30 "LexisNexis Unveils LexisNexis MedMal Navigator - Interactive Litigation Tool Significantly Streamlines Complex Medical Malpractice Case Preparation", 30 January 2013 <http://www.aol.com/article/2013/01/30/lexisnexis-unveils-lexisnexis-medmal-navigator-int/20443042/>

31 Tam Harbert, "Supercharging Patent Lawyers With AI: How Silicon Valley's Lex Machina is blending AI and data analytics to radically alter patent litigation", 30 October 2013 <http://spectrum.ieee.org/geek-life/profiles/supercharging-patent-lawyers-with-ai>

32 "LexisNexis Acquires Premier Legal Analytics Provider Lex Machina", 23 November 2015 <https://lexmachina.com/media/press/lexisnexis-acquires-lex-machina/>

101. Again, the use of Online Dispute Resolution has caught on in more traditional adjudication settings:

(a) **Rechtwijzer 2.0**, an online service provided by the Netherlands Ministry of Justice and Security, is designed to assist parties in "relational disputes" such as matrimonial, landlord-tenant and employment disputes.[33] It helps parties to frame their disputes through a question and answer session, which also helps to generate automated legal guidance to assist in the negotiation phase. Finally, if the dispute still cannot be resolved, the parties can seek online mediation or arbitration.

(b) In the United Kingdom, the Civil Justice Council's Online Dispute Resolution Advisory Group advocates the establishment of an internet-based court service called **HM Online Court**, which introduces online dispute resolution for claims below £25,000.[34] It proposes the use of artificial intelligence to provide legal diagnosis and draft documents, the facilitation of negotiation and informal settlement without direct human involvement, and the advising of judges on possible decisions and lines of reasoning.[35]

102. The Singapore Mediation Centre ("SMC") intends to explore the use of technology to improve the efficiency of existing dispute resolution mechanisms (*eg* the use of video-conferencing for mediation sessions). Further, SMC will be exploring the use of technology for new dispute resolution mechanisms for high volume, low value frontline disputes, which will include a study on the feasibility of deploying predictive/prescriptive machine learning technology. This has potential for application in a number of sectors to deal with consumer complaints and in resolving such disputes before they escalate into claims in the judicial system, *eg* Small Claims Tribunal. SMC will also be exploring the possibility of online dispute resolution processes for disputes involving telcos, credit card transactions and/or online retailers as potential pilots.

Regulatory Compliance

103. Much of the focus thus far has been on technological innovation in litigation. For instance, while electronic discovery has become firmly entrenched in the legal landscape in countries such as the United States, and has also taken root locally, developments in the conduct of corporate due diligence has lagged behind. This is understandably so – while discovery merely involves a binary analysis as to whether a document is relevant, due diligence requires a more granular understanding of what can be highly complex provisions. But there is no reason why the drive for technological advancement should be confined to litigation. Indeed, corporate law departments are structured with the aim to achieving greater productivity and efficiency. This makes the work that they do ideal for the adoption of automated technology.[36] Legal Tech solutions relating to the conduct of due

---

33 "Rechtwijzer 2.0: Technology that puts justice in your hands" <http://www.hiil.org/project/rechtwijzer>

34 "Online Dispute Resolution for Low Value Claims" <https://www.judiciary.gov.uk/reviews/online-dispute-resolution>

35 The report expressly excludes the possibility that judges can be replaced by software, but it is possible that technology may become sufficiently advanced to undertake the determination of smaller-value claims, especially if they relate to a largely quantitative analysis.

36 "Jordan Furlong: AI Should Be Helping Lawyers Move Up The Value Chain", 18 August 2016 <https://artificiallawyer.com/2016/08/18/jordan-furlong-ai-should-be-helping-lawyers-move-up-the-value-chain/>

diligence and compliance already exist in the market. **RAVN ACE** is able to sift through documents and extract specific information, which can then be presented in a structured form. The system, which uses Deep Learning-type algorithms to understand the words and phrases in the context in which they are used,[37] has already been implemented by Berwin Leighton Paisner to search through Land Registry documents and extract details,[38] while Linklaters has also entered into a Master Service Agreement with RAVN to develop a programme to search regulatory registers.[39] This is an area that the open process may identify problems and challenges facing corporate legal departments, and research and development funding may spur the creation of Legal Tech solutions.

104. There are a number of legal compliance matters that can benefit from Legal Tech solutions in this space. A solution that can extract relevant dates and clauses from contractual and other documents, and which are managed in a register that can also keep track of time, will be a boon to any number of in-house counsel who have to manage, for example, intellectual property assets and personal data assets; and to track against the expiry of licences, contracts, versions of consent, *etc*.

Blockchains

105. A blockchain is a shared public ledger or database of transactions that everyone can inspect, but which no single user controls. The participants in a blockchain system collectively keep the ledger up to date: it can be amended only according to strict rules and general consensus. In the context of Bitcoin, the blockchain contains the payment history of every bitcoin in circulation, providing proof of who owns what at any given juncture. This distributed ledger is replicated on thousands of computers (Bitcoin's "nodes") around the world and is publicly available. Despite this openness, the blockchain is also trustworthy and secure. This is guaranteed by the mixture of mathematical subtlety and computational brute force built into its "consensus mechanism" - the process by which the nodes agree on how to update the blockchain in the light of bitcoin transfers from one person to another. Bitcoin "miners" from around the world are happy to devote their computer resources to verifying Bitcoin transactions, earning bitcoins in the process.

106. Blockchain technology is anticipated to have far wider repercussions on the modern economy beyond Bitcoin. In the legal services sector (both private and public), the most significant impact of the blockchain would arguably be the adoption of smart contracts and tamper-proof public databases. In smart contracts, contractual clauses are embedded in both hardware (a forebear being vending machines) and software (in a manner akin to digital rights management mechanisms for digital content), allowing for automatic execution or enforcement once certain (coded) conditions have been verified by the blockchain to have been fulfilled. A tamper-proof public database would allow for the doing

---

37 Christina Mercer, "Meet Ravn ACE: the data processing robot using AI to make sense of your data", 25 April 2016 <http://www.techworld.com/startups/heres-how-ravn-systems-is-harnessing-power-of-ai-3638980/>

38 "Linklaters confirms AI deal with RAVN", 18 May 2016 <http://www.legaltechnology.com/latest-news/linklaters-confirms-ai-deal-ravn/>

39 Ashima Ohri, "Legal robots: Law firms make a beeline for AI", 19 May 2016 <http://www.legalbusinessonline.com/news/legal-robots-law-firms-make-beeline-ai/72386>

away of centralised institutions and bureaucracies in the "trust business": banks, clearing houses and government authorities that are deemed sufficiently trustworthy to handle transactions. One example would be government land registers. We turn now to look at these applications in greater detail.

Governance and Government

107. While the decentralised approach helps to facilitate transactions between two non-trusting parties without the need for a neutral intermediary, a question arises as to whether such technology is necessary where there already exists a trusted central authority. For instance, given that the Singapore Land Titles Registry is a trusted central registry which is recognised and credible, a strong argument can be made that the benefits to be reaped would be disproportionate to the costs required. Exploratory discussions on the use of blockchain technology in the conveyancing process did not obtain traction, despite recognition of the potential in the concept, for a couple of reasons: the high level of trust in the central land registry and the low level of adoption of the technology by financial institutions involved in the conveyancing process.

108. However, as noted in a report by the UK Government Chief Scientific Adviser,[40] a potential benefit of registering assets on a distributed ledger is that the properties effectively become "smart assets" by providing proof of record for a wide variety of transactions. This could include personal legacy documents such as wills, lasting powers of attorney, CPF nominations, insurance records and advanced medical directives. Further, this sidesteps the need for owners to produce the documents in question. Already, Estonia has entered into a partnership with BITNATION, "the world's first Blockchain powered virtual nation", to offer notary services to Estonian e-Residents. This means that Estonian e-Residents will be able to notarise their marriages, birth certificates and other documents on a public distributed ledger located entirely online.[41]

109. In any case, there might be a need to develop the ecosystem and infrastructure in preparation for future use of blockchain technology by local entities or otherwise. In transactions with a cross-border element, in which trust levels are likely to be low due to differences in operational and regulatory landscapes, there may still be strong incentives for parties to do away with a third party intermediary, such as a bank. This is particularly the case where the third party itself is in a separate jurisdiction and it may be difficult to protect the relevant data from the government of that third party.[42] The use of distributed ledgers as an independently verifiable record of assets that is not controlled by other parties would allow financing to be obtained against these assets.[43]

---

40 UK Government Office for Science, *Distributed Ledger Technology*: beyond block chain, at p 69.
41 "Estonia e-Residency Program & Bitnation Dao Public Notary Partnership", 27 November 2015 <https://bitnation.co/blog/pressrelease-estonia-bitnation-public-notary-partnership/>
42 DBS Bank Ltd, *Understanding Blockchain Technology and What it Means for Your Business,* February 2016, at p 10.
43 DBS Bank Ltd, *Understanding Blockchain Technology and What it Means for Your Business,* February 2016, at p 22.

Smart Contracts

110. The more ambitious application of blockchain technology lies in smart contracts. One simple example is **Lighthouse**, a decentralised crowdfunding service built on the Bitcoin platform.[44] It dispenses with the need for trusted third parties by disbursing pledged money only if the target amount has been attained and certain pre-set conditions have been met; if not, the money is returned to the backers.

111. There are many reasons why smart contracts appeal as an alternative to traditional legal contracts. They provide certainty in providing for a highly specific set of outcomes that are computer-guaranteed. There is no confusion between the contracting parties as to what has been agreed upon. Smart contracts are also more easily standardised and are immutable, in that the execution of a contractual rule cannot be reversed or modified. Not only does it dispense with the need for a trusted intermediary, its self-enforcing nature also has the potential to dispense with the need for judges.

112. All of these characteristics make smart contracts perfectly suited for decentralised escrow services. The most obvious application would be in the conveyancing process, in which payment for property is placed in a conveyancing account, which can be an escrow account in the names of the parties' lawyers. The use of smart contracts in the conveyancing process may likely also cut out the inefficiency that arises out of the low trust conditions that arise at particular points of a transaction, such as during completion.

113. While initial projects either built on the Bitcoin blockchain or were designed from scratch to support particular activities such as decentralised exchange,[45] **Ethereum** revolutionised smart contracts by having a single public blockchain that was programmable by parties to perform any task, unconstrained by the blockchain itself. It is currently the most advanced smart contract-enabled public blockchain, and allows anybody with Internet access to create a smart contract within it. Each smart contract is essentially a program with an associated database, which is triggered when another user of the blockchain or another smart contract calls upon it. It then reacts according to what it has been programmed to do, for instance, to verify the source of its instructions, modify its database or trigger another smart contract. This is repeated on every node in the network.

114. Closer to home, **Legalese,** a Singapore-based start-up is working on an open-source project to "draft legal documents the way programmers develop software".[46] Instead of working on extracting meaning from unstructured data in contracts, semantics are captured in their proprietary programming language, which can then be compiled into English, Chinese or any other language – such as code for use in smart contracts.[47] However, the project appears to be very much in the gestation phase.

---

44 Sandrine Ayral, "Lighthouse Is A Crowdfunding Platform Built On Top Of Bitcoin", 23 May 2014, <https://techcrunch.com/2014/05/23/lighthouse-is-a-crowdfunding-platform-built-on-top-of-bitcoin/>

45 Gideon Greenspan, "Smart contracts: The good, the bad and the lazy", 2 November 2015 <http://www.multichain.com/blog/2015/11/smart-contracts-good-bad-lazy/>

46 <https://legalese.com/>. Please note that this Legal Technology Vision takes no position as to Legalese's compliance with the Legal Profession Act and the reference in the text is for information only.

47 Dayana Sobri, "JFDI founders working on a new startup that will revolutionise legal contracts", 20 July 2016 <https://e27.co/jfdi-founders-working-on-a-new-startup-that-will-revolutionise-legal-contracts-20160720/>

115. Recent developments have nevertheless shown that there might be significant hurdles to be overcome before smart contracts can be considered an adequate replacement for traditional ones. On 17 June 2016, a party managed to exploit a bug in the Decentralised Autonomous Organisation ("DAO"), an investment fund hosted on an Ethereum-based system, to withdraw US$50m of virtual currency.[48] This resulted in the execution of a "hard fork", which rewrote the history of the blockchain.[49] This is not only completely at odds with the immutability promised by smart contracts, but brings about a host of complicated legal questions such as the legal nature of the DAO or more fundamentally, whether there is any legal difference between a deliberate feature and an exploit.[50] For these reasons, it is foreseen that there is some way to go before smart contracts gain ubiquity.

---

48 Klint Finley, "A $50 Million Hack Just Showed That The DAO Was All Too Human", 18 June 2016 <https://www.wired.com/2016/06/50-million-hack-just-showed-dao-human/>

49 Michael del Castillo, "Ethereum Executes Blockchain Hard Fork to Return DAO Funds", 20 July 2016 <http://www.coindesk.com/ethereum-executes-blockchain-hard-fork-return-dao-investor-funds/>

50 Matt Levine, "Blockchain Company's Smart Contracts Were Dumb", 17 June 2016 <https://www.bloomberg.com/view/articles/2016-06-17/blockchain-company-s-smart-contracts-were-dumb>

“What is worth developing further is the scale and pace of conversation and innovation, so that we can encourage promising Legal Tech start-ups to flourish and succeed.”

Chapter 5: Accelerating Legal Tech — Incentivising an Ecosystem

116. For Singapore's legal industry to remain relevant to modern entrepreneurs such as Fiona, whom we met in Chapter 1, it is crucial that a healthy ecosystem be in place for legal start-ups to flourish. Accordingly, while the previous chapter focused on specific government-led initiatives to embrace legal technology, this chapter takes a broader approach centring on the facilitative role the government can play to foster an industry-led Legal Tech ecosystem.

117. Once properly established, such an ecosystem would ideally encourage the blossoming of Legal Tech initiatives not just on the domestic stage, but within the region as well. An example of such a regional success would be Law Canvas, which Fiona used to great effect in starting her business: by serving both the Malaysian and Singaporean markets, the company is able to leverage on economies of scale, and Singaporeans wishing to do business in Malaysia (and *vice versa*) have a convenient one-stop solution for their legal needs. Regional success then comes to be the natural stepping stone to global exposure – particularly for a country with a small internal market like Singapore.

118. Before turning to consider what seeds should be sown to ensure a successful local and regional Legal Tech ecosystem, however, it is instructive to revisit briefly the nature of the disruption facing the legal profession in Singapore and around the world.

Disruption Facing the Legal Profession

119. "Disruption" is often used to describe a fundamental change in the way a process or business is conducted as a result of deployment of new technology. Examples include:

(a) photography – digital image capture and storage effectively replacing film in the vast majority of applications;

(b) the media industry – consumption of online news or on-demand video disrupting traditional print and broadcast media; and

(c) the retail industry – where e-commerce has not only provided a wider selection of products and services and increased consumer choice, but has also changed consumer behaviour.

120. The legal profession is as likely to be disrupted by legal technology as any other profession or industry segment. Advancements in artificial intelligence, natural language processing, data analytics, as well as new technologies such as the blockchain and on-demand resourcing of cloud computing, provide a compelling foundation on which to transform the practice of law and the delivery of legal services.

121. Deployment of Legal Tech in highly successful legal practices is no longer a curious distraction. In 2016, major law firms started using automated document due diligence tools such as Kira[51] and RAVN ACE,[52] and ROSS (powered by IBM Watson).[53] These Legal Tech solutions have already been touched on in Chapter 4.

122. Currently, legal technology is used as a complement to the delivery of legal services – *eg* by improving operational processes – and has not yet transformed the practice of law. This is so notwithstanding the fact that technology in general is ubiquitous, advancing rapidly, and increasingly being adopted. It is submitted there are two main reasons for the marginal impact technology has had on the legal industry to date:

    (a) First, the relative lack of maturity or universality in the adoption of Legal Tech which complements the delivery of legal services. This is the starting point without which higher order ideas around new ways of using Legal Tech are less likely to take root. Put another way, without some experience in operational process transformation, it is harder for lawyers to come to terms with the process in which the client experience should be transformed, and accordingly the development of new business models. Hence, it is necessary that lawyers make better use of infocomm media technologies and extend their experience to using Legal Tech solutions targeted at lawyers. With this as the backdrop, lawyers (not all, but hopefully enough) will be able to conceptualise how they can craft Legal Tech solutions to deliver legal services to clients both existing and new.

    (b) Second, the lack of opportunities for the commingling of synergistic or adjacent disciplines that are necessary for the sparking of innovation in Legal Tech. This commingling (*eg* between lawyers and computer scientists, or between entrepreneurs and investors) is necessary to create the conditions that promote cross pollination of ideas for Legal Tech solutions, both operational and transformational. The more opportunities for professionals from legal, computing and financial disciplines to meet in a setting that promotes ideation and the co-creation of solutions to address real world problems, the higher the chance that relevant Legal Tech solutions will be created.

123. The foregoing are not permanent barriers, so as time progresses, it will become more and more likely that fundamental disruption will occur.

124. It is in the interests of the Singapore economy, and the Singapore legal profession, that we prepare ourselves to harness such disruption – or to put it another way, such *innovation*[54] – to keep Singapore at the forefront of delivering legal services and, potentially, develop new technologies that other

---

[51] "DLA Piper partners with Kira Systems to leverage artificial intelligence tool for M&A due diligence", 14 June 2016 <https://www.dlapiper.com/en/us/news/2016/06/dla-piper-partners-with-kira-systems/>

[52] "Linklaters confirms AI deal with RAVN", 18 May 2016 <http://www.legaltechnology.com/latest-news/linklaters-confirms-ai-deal-with-ravn/>

[53] "Womble Carlyle partners with ROSS Intelligence", 7 October 2016 <http://www.legaltechnology.com/latest-news/womble-carlyle-partners-with-ross-intelligence>

[54] This sentiment is also wholly compatible with existing strategic initiatives to promote Singapore law, regionalise Singapore legal practices and promote Singapore as a forum for dispute resolution/alternative dispute resolution.

> "... harness the existing characteristics of the Singapore innovation ecosystem in order to create the foundations for a vibrant legal tech ecosystem."

countries and industries may follow.[55] This in turn raises the knock-on question of how to ensure that there is sufficient breeding ground in Singapore for the identification, deployment and ultimately innovation of Legal Tech.

The Idea of an Ecosystem

125. The technology ecosystem in the Silicon Valley is synonymous with innovation. There are many other cities with a similar reputation for innovation (London, Tel Aviv, Singapore), but none have the same rich combination of nutrients that feed research, spins off successful experiments into start-ups, and matures them into the technology behemoths of today.[56]

126. The value of this ecosystem cannot be understated. It is a self-sustaining cycle which:

(a) conducts deep research into novel technology;

(b) brings together entrepreneurs, innovators and engineers to share use cases and solutions enabled by technology;

(c) identifies opportunities for starting up experiments for such solutions;

(d) benefits from a pool of "early adopter" customers that provide feedback and brand growth;

(e) provides access to capital, talent and advisory resources through the development cycle of a start-up from inception, early funding, late stage funding and exit (through listing or acquisition);

(f) trains, incentivises and supports these innovators, entrepreneurs and engineers who carry the ideas into the market;

---

[55] The converse is equally valid. Given the borderless nature of technological advancement, if Singapore does not harness or deploy innovative technology, it becomes likely that Singapore's legal profession will be left behind.

[56] "Silicon Valley Tech Innovation Ecosystem" <https://www.accenture.com/_acnmedia/Accenture/Conversion-Assets/DotCom/Documents/Global/PDF/Technology_10/Accenture-Silicon-Valley-Tech-Innovation-Ecosystem-Infographic.pdf>

(g) recycles the proceeds from a successful exit back into the ecosystem to identify the "next big thing"; and

(h) safeguards the interests of consumers of legal technology.

127. Many of the above ingredients for a successful innovation ecosystem already exist in Singapore. Singapore benefits in particular from a good base for cutting-edge research, an excellent transport and lifestyle infrastructure which makes Singapore a great place to live and work, and a particularly differentiated type of public/private sector partnership.

128. It is therefore not a particularly ambitious vision for the legal sector to harness the existing characteristics of the Singapore innovation ecosystem in order to create the foundations for a vibrant Legal Tech ecosystem.

129. Bearing this in mind, the strategy should be to encourage a climate of innovation by supporting and developing the Legal Tech ecosystem by:

(a) Identifying gaps in the existing ecosystem for Legal Tech; and

(b) Incentivising various initiatives to fill in these gaps organically or inorganically.

The remainder of this Vision will be devoted to elaborating on the foregoing two items.

The Importance of a Broad Network for Legal Tech

130. As a starting point, Singapore does not suffer from an absence of Legal Tech start-ups, although it can be said that after close to two decades of computerisation efforts in the legal sector, the Legal Tech scene is still far from reaching its true potential. The existing innovation ecosystem in Singapore has given birth to several local entrepreneurial projects[57] as well as forums for the gathering of like-minded individuals.[58] What is worth developing further is the scale and pace of conversation and innovation, so that we can encourage promising Legal Tech start-ups to flourish and succeed.

131. These conversations should not merely occur between entrepreneurs, tech-savvy lawyers, engineers and investors. It is necessary for incumbent lawyers to be part of the conversation. It is, for example, important for such lawyers (many of whom are in senior management positions) to be sensitive to the changing demands of clients – such as in-house counsel who are accountable for budgets for legal expenditure. As those budgets are impacted by broader corporate digitisation and transformation, in-house counsel are increasingly demanding more efficiency from the legal profession – which is in turn a driver for the adoption of innovative technologies.

132. There is also a corollary in that incumbent lawyers can gain "first-mover" advantage if they are quick to adopt Legal Tech. Greater effort to draw incumbent lawyers into the conversation can

---

[57] <www.intelllex.com> and <www.legalese.com> are two more prominent examples.
[58] <www.altlaw.xyz>

expose them to think about Legal Tech more, and the bolder, more ambitious and creative firms or individuals would be better placed to take advantage.

133. On the other side of the house, entrepreneurs, engineers, investors and innovators must be brought into the conversation to understand the legal industry and its needs, so that they can bring their ideas, expertise and funds into the mix. Their involvement could also help create the "buzz" and excitement that could fuel further participation and innovation in the Legal Tech ecosystem.

134. The world of Fintech also benefits from a degree of "buzz". In Singapore, there are many platforms for publicising Fintech initiatives and companies, including festivals, awards and hackathons, but equivalent initiatives for Legal Tech in Singapore are limited.[59] This results in a lower degree of visibility or peer review for innovation, which in turn makes it more difficult to identify, triage and improve ideas quickly. In this connection, we propose the following initiatives:

(a) Encourage more networking opportunities or platforms for publicising innovative projects or technology, and for facilitating collaboration between legal practitioners, entrepreneurs, innovators, engineers and potential clients. These could include events, hackathons, festivals and media publications. Particular emphasis could be placed on bringing law firms into the perimeter for such networking, and connecting them with the entrepreneurs and innovators.

(b) Provide dedicated physical space for networking. In its most ambitious form, the physical space can catalyse incubation and acceleration of Legal Tech. Logically, the space can begin as a networking/co-working space, which can then add incubation or acceleration goals as a critical mass of support grows. The Legal Innovation Zone in Canada, which is a co-working space located in a university for entrepreneurs, lawyers, students, tech experts, government members and industry leaders, is an example of what shape this concept can take.[60]

(c) Conduct outreach sessions with renowned lawyers (statutory office holders, Senior Counsel, law firm managing partners) showcasing frontier technology capabilities, global case studies of successful transformations, and dialogue potential revenue opportunities with clients of the law firms.

(d) Identify successful Legal Tech entrepreneurs and early adopters of Legal Tech who can be deployed as "evangelists"[61] in broader networking initiatives.

(e) Create an industry innovation award to recognise achievements in Legal Tech. One potential candidate is the Singapore Academy of Law Awards. Inaugurated in 2008, these quinquennial awards are a recognition of notable contributions of the recipients for service in promoting and advancing the objectives of the Academy. The creation of a Legal Tech award could be considered to recognise innovative Legal Tech solutions or companies.

---

[59] Globally, there is more media attention. For example, there are specialist Legal Tech news portals, and also legal innovation awards. See for example the Financial Times which has awards for innovation in legal practice <http://www.ft.com/innovativelawyers>.

[60] <http://www.legalinnovationzone.ca>

[61] Silicon Valley had the iconic Steve Jobs. Today, the world of tech has Mark Zuckerberg, Jack Ma and Elon Musk. At a more domestic level, prominent senior lawyers in Singapore can play a critical role to help support innovation and adoption of Legal Tech.

Collaborating with Universities and Research Institutions

135. In order to establish a viable Legal Tech ecosystem, it is important to have a vibrant tertiary education or university system wherein innovation is encouraged early, collaboration with engineers is a given, and entrepreneurship in Legal Tech is a potential career option.[62]

136. This gap in tertiary education also manifests in post-graduate scenarios with limited collaboration between the legal profession and major research institutions in Singapore, particularly in the field of applied research and development (*eg* the A*STAR Institute for Infocomm Research, or the NUS Business Analytics Centre). What then results is lawyers not being familiar with the Legal Tech research, and engineers not understanding (and correspondingly not being in a position to attempt to fix) problem statements from the legal profession.

137. Stanford University is often held up as a role-model for the way a university programme complements innovation in Silicon Valley. In turn, Stanford Law School is renowned for interdisciplinary learning, with a programme, **CodeX**, where "… researchers, lawyers, entrepreneurs and technologists work side-by-side to advance the frontier of legal technology".[63]

138. In 2016, the world of Fintech in Singapore received a boost with the execution of a Memorandum of Understanding by the Monetary Authority of Singapore with the five local polytechnics. The three-year collaboration is intended to "prepare and equip [polytechnic] graduates with the skill sets necessary to take on new Fintech-related jobs emerging in the financial sector".[64]

139. The law schools can do the same, and consider the following initiatives:

(a) Create a focus on innovation, *eg* by collaborating with computer science or other faculties and the broader innovation ecosystem in Singapore, to build a better interdisciplinary educational foundation for technology (as a whole) and Legal Tech. This need not necessarily be frontier research in all cases, but can also include awareness and education around baseline/enhanced/innovative applications of Legal Tech, from which a smaller minority of undergraduates may then take inspiration. From there, a sustainable culture of entrepreneurship and innovation in the legal profession can take root.

(b) Review how Legal Tech can be integrated into existing modules in law schools, particularly the use of Legal Tech solutions in different practice areas. It is important to focus on integrating the Legal Tech with existing modules, as opposed to teaching Legal Tech separately.

(c) Create specific modules that focus on the application of infocomm media technology in legal practice for students with an interest in the Legal Tech space. Such courses should include business and entrepreneurial skills.

---

[62] The availability of alternative career options will also synergise with managing potential concerns over a strategic oversupply of lawyers.

[63] <https://law.stanford.edu/codex-the-stanford-center-for-legal-informatics/>

[64] "MAS and Local Polytechnics Sign Memorandum of Understanding to Promote Skills Development in Financial Technology", 3 October 2016 <http://www.mas.gov.sg/News-and-Publications/Media-Releases/2016/MAS-and-Local-Polytechnics-Sign-Memorandum-of-Understanding-to-Promote-Skills-Development-in-FinTech.aspx>

140. The government and the wider legal profession can also look to support the law schools by:

(a) Matching interested law firms with research institutions and Legal Tech start-ups to collaborate on use cases and potential solutions in the field of Legal Tech.

(b) Creating incubator centres in law schools to facilitate mentorship and guidance on Legal Tech, allowing for the nurturing and promotion of entrepreneurial spirit.

Access to Capital

141. A major catalyst for innovation is funding. Silicon Valley has a particularly robust funding ecosystem which ensures access to capital at all stages of development – angel investment to pre-IPO. However, the strategy for the Singapore legal profession should not depart too far from the norm, given the broader availability of capital in Singapore. It is likely that the more important initiative is to ensure that investors are aware of Legal Tech opportunities, either from networking or from a specific Legal Tech-focused fund. The following initiatives can be considered:

(a) Collaborate with venture capital already in Singapore to build awareness of Legal Tech investment opportunities. Ensure that the potential investor base is plugged into the networking perimeter for Legal Tech.

(b) Form a fund to invest in Singapore Legal Tech. This has an added benefit of generating external "buzz" and encouraging law practices and entrepreneurs to participate in the development of the Legal Tech sector.

(c) Crowd funding techniques that have been successful in other areas could be of relevance here, *eg* Kickstarter campaigns.

Addressing Demand

142. To address the demand side of the equation, we need to develop strategies to create excitement and interest about Legal Tech solutions. Law firms and other consumers of legal services need to be convinced about the benefits of Legal Tech innovations so that they will be willing investors in or adopters of such new Legal Tech. They are key in helping start-ups identify business use cases and opportunities. Strategies will also seek to ensure that the enthusiasm in identifying challenges, through to the co-creation of Legal Tech solutions and prototyping, can be sustained and will result in the eventual adoption of such Legal Tech.

Planting the Seeds of Innovation

143. The ideas in the foregoing sections of this chapter are not premised on the collocation of stakeholders within a physical space, but as has already been noted at paragraph 60, the benefits of actual proximity cannot be gainsaid. Going forward, the intention is for the maximisation of opportunities for like-minded lawyers, computer engineers and entrepreneurs to congregate by creating an environment that will bring them together. This co-working space will enable lawyers who are prepared to conduct their practice in a virtual setting to commence their new practices side-by-side with Legal Tech start-ups. Both will be given access to the co-working space for short-term periods as they find their footing in their fledgling businesses.

144. It is expected that this co-working space will showcase the future of legal practice built around a core suite of Legal Tech solutions that provides the lawyer with access to legal research, client and billing management and other needs for him to run his practice. These lawyers are likely to be able to not only provide feedback that improves these services, but will also be keen to explore new ideas for Legal Tech solutions with their co-working Legal Tech start-up neighbours. Legal Tech start-ups will benefit by gaining access to a pool of lawyers who are selected for their propensity to think out of their box and who are keen to participate in the Legal Tech innovation cycle.

Leadership and Governance

145. As mentioned earlier, a key advantage which Singapore has is a particularly differentiated type of public sector/private sector partnership. Allied with the Smart Nation initiative, it is conceivable that innovative Legal Tech ideas in Singapore can be rapidly socialised and supported through law firms, investors, technology experts, potential customers and public policy channels faster than in other jurisdictions. This advantage should be exploited.

146. It must also be expected that the conditions for an ecosystem will evolve over time: Singapore will rise and fall in benchmarks for cost of living, frontier research innovations will occur in many different jurisdictions and will need to be applied/adopted, and the demand-side pressures for efficiency can change depending on economic conditions. Such macro trends need to be tracked well.

147. These factors in turn build a case for an overall governance/leadership mechanism by which the ecosystem for Legal Tech can be monitored, new initiatives assessed, in-flight performance of initiatives measured, and, as appropriate, incentivised or disincentivised accordingly.

148. From the foregoing discussion, it is clear that the development of the Legal Tech ecosystem will require a concerted effort by multiple stakeholders over a significant period of time. Cooperation and collaboration between Legal Tech start-ups, lawyers, subject matter experts (innovation, computing, cybersecurity, financing and investment), the public sector, other industry stakeholders (in particular, the Ministry of Law, the Judiciary, the Academy and the Law Society) and potential customers will be of paramount importance if the digital disruption of the legal profession is to lead to positive outcomes for all.

> “The initiatives proposed … require our collective vision, joint industry and shared ambition.”

Chapter 6: From Concept to Reality

149. A smorgasbord of innovations and ideas has been presented in this Legal Technology Vision, across two distinct axes. On the time axis, a gradual ramping up of Legal Tech solutions is countenanced over a five-year time frame, beginning from the adoption of baseline solutions by a majority of law firms to the test-bedding of experimental initiatives on the back of iterative feedback from industry. On the scale axis, we have seen an expansive spectrum of Legal Tech solutions, ranging from innovative individual mini-disruptors (such as the automated authority-citation tool CARA) to broader reforms across the sector (such as initiatives for establishing a wider Legal Tech ecosystem in Singapore). To be sure, not all the answers to ensuring that the Singapore legal profession prospers in the event of a Legal Tech disruption are contained within the two axes just outlined. However, if a disruption happens, it is incumbent on the Singapore legal profession to put itself in the best position possible to identify the best opportunities fast, and thereafter to adapt and thrive. The initiatives proposed here seek to achieve just that. They require our collective vision, joint industry and shared ambition. Executed well, there is no reason why Singapore cannot be an Asian hub for legal innovation.

150. To bring this Vision forward into implementation, there are multiple tracks of work that have to be commenced with each taking different periods to gestate. The following six areas of focus have been identified:

(a) **Legal Tech Adoption.** A list of infocomm media and Legal Tech tools that will form the baseline suite should be drawn up, facilitating the ascertainment of the current state of adoption. Adoption milestones can thereafter be set, and measures for adoption formulated and executed, with the objectives and goals of this Vision in mind. It should also be ensured that there is sufficient information to assist lawyers in their purchase decision and to maximise their return on investment in Legal Tech solutions (not confined only to the baseline suite). The Ministry of Law will oversee this focus area working with the Law Society and other agencies such as SPRING Singapore. Separately, this focus area may also benefit from coordination with the Academy's LIFTED programme on Legal Tech training.

(b) **LawNet Improvements.** This focus area should be primarily under the area of the Academy. The general idea is to follow up on the suggestions for improving LawNet through both enhancements and new services that have been collated during the Legal Technology Vision Retreat, ensuing focus groups and through the usual feedback channels. The ideas will have to be properly scoped and a schedule for delivery of improvements established. Crucially, the Academy will have to articulate a *modus operandi* that will enable greater partnership with Legal Tech players and formulate policies to (i) identify Legal Tech solutions to be incorporated as LawNet services and (ii) allow Legal Tech solutions from partners to be offered through the LawNet platform to its subscribers.

(c) **Legal Tech Acceleration.** This focus area involves the development and execution of an implementation plan that encompasses the ideas articulated in the Vision to identify and

nurture innovative concepts. It is also closely tied to the landscaping that is necessary to create an ecosystem on which a Legal Tech start-up culture can take root. The terms of reference for this focus area – which will be looked at by the Ministry of Law, the Judiciary and the Academy – are perhaps the most open-ended and the measures of success probably the most difficult to define. But this only underscores the enormity of the task that falls within the ambit of this focus area and the size of the ambition that will be required. The initial work plan produced will have to cover the ideas for potential Legal Tech solutions making use of data analytics, machine learning and blockchain to address the issues and challenges identified in Chapter 4. Such a work plan should articulate and execute the transparent and open innovation framework discussed in Chapter 4, and assemble and manage the set of incentives for the promotion of Legal Tech start-ups discussed in Chapter 5. Finally, all parties involved in this focus area will function as advocates and cheerleaders of Legal Tech start-ups.

(d) **Online Dispute Resolution.** The Ministry of Law and the Judiciary will be jointly studying the feasibility of deploying predictive/prescriptive machine learning in online systems that are intended to facilitate or even resolve disputes. The work in this area underscores the continued importance for collaboration between public agencies and will also include members from the Singapore Mediation Centre and the Academy. Recommendations can be made after suitable use cases have been identified.

(e) **Regulation.** The Ministry of Law, in consultation with the Professional Conduct Council, the Judiciary and the Law Society, will, where appropriate, look to clarify and modernise outdated regulations and practice directions in order to support the goals and objectives of this Vision.

(f) **Legal Data Portability Standards.** The Academy will spearhead work in this focus area through collaboration with technical subject matter experts. The goal will be to define and publish an open LegalXML standard for the legal sector. To attain this goal, co-ordination with public sector agencies to promote the adoption of open technical data standards will be necessary.

151. The six areas of focus as identified in the preceding paragraph should be overseen by the Academy and the Ministry of Law.

152. This Vision is a stark departure from the past. It establishes a set of global objectives and policies that are aimed at achieving its goals of increasing the promotion, adoption and development of technology, with the aim of enhancing the efficiency and capabilities of the legal sector. With this Vision, the Academy is pivoting from a LawNet-centric strategy in achieving its mission towards one that leverages LawNet as one channel of delivering Legal Tech services, encouraging the use of commercial off-the-shelf Legal Tech solutions with an emphasis on data portability and interoperability.

153. The broader adoption of baseline Legal Tech solutions and improvements to LawNet services only go as far as providing Legal Tech tools that complement and promote the efficient delivery of legal services. Spurring a generation of lawyers who are prepared to step away from their comfort zones to create Legal Tech solutions that help deliver legal services in more innovative ways is the high watermark that this Vision aims to achieve. It is only by harnessing the disruptive capacity of

infocomm media technology that the legal sector may enhance its ability to deliver legal services for the future and to a regional market. When that day comes, we would have truly enhanced the capabilities of our legal sector and in so doing, contributed in no small measure towards cementing Singapore as a legal hub.

Annex A

Legal Technology Vision Working Group

	NAME	TITLE	ORGANISATION
1	Mr Yeong Zee Kin (Chairman)	Assistant Chief Executive / Deputy Commissioner	Personal Data Protection Commission, Infocomm Media Development Authority
2	Mr Tan Sze Yao	Deputy Senior State Counsel	Attorney-General's Chambers
3	Mr Foo Nian Chou	Senior Director	Singapore Academy of Law
4	Ms Tan Xiao Wen	Assistant Director	Singapore Academy of Law
5	Mr Michael Tan	Head of Legal, Southeast Asia and India Legal Partnerships	Google Singapore
6	Mr Lam Chee Kin	Managing Director and Head Group Compliance	DBS Bank Ltd
7	Mr Lim Seng Siew	Partner	OTP Law Corporation
8	Ms Elaine Tan	Director	Amica Law LLC
9	Mr Rakesh Kirpalani	Director	Drew & Napier LLC
10	Mr James Elisha Lee	Assistant Registrar	Supreme Court
11	Mr Chua Wei Yuan	Justices' Law Clerk	Supreme Court
12	Mr Wong Thai Chuan	Justices' Law Clerk	Supreme Court
13	Mr Wilbur Lua	State Counsel	Attorney-General's Chambers
14	Ms May Ng	State Counsel	Attorney-General's Chambers

Annex B

Participants in Legal Technology Vision Retreat

NAME	TITLE	ORGANISATION
LEGAL TECHNOLOGY COMMITTEE MEMBERS		
Justice Lee Seiu Kin	Judge	Supreme Court
Justice Chan Seng Onn	Judge	Supreme Court
JC Aedit Abdullah	Judicial Commissioner	Supreme Court
JC Valerie Thean	Judicial Commissioner Presiding Judge	Supreme Court Family Justice Court
Ms Juthika Ramanathan	Chief Executive	Supreme Court
JC See Kee Oon	Judicial Commissioner Presiding Judge	Supreme Court State Courts
Mr Tan Ken Hwee	Chief Prosecutor	Attorney-General's Chambers
Mr Yeong Zee Kin	Assistant Chief Executive / Deputy Commissioner	Personal Data Protection Commission, Infocomm Media Development Authority
Ms Thian Yee Sze	Director-General	Ministry of Law
Mr Tan Boon Khai	Chief Executive	Singapore Land Authority
Mr Lim Yew Jin	Director, Assistant Official Assignee & Public Trustee / Deputy Director	Insolvency Office, Public Trustee's Office and Registries of Moneylenders & Pawnbrokers
Mr Andy Sim	Assistant Chief Executive	Accounting and Corporate Regulatory Authority
Mr Tan Eng Pheng	Senior Director	Infocomm Development Authority of Singapore
Professor Yeo Tiong Min	Dean	School of Law, Singapore Management University
Professor Simon Chesterman	Dean	Faculty of Law, National University of Singapore
Mr Lim Seng Siew	Council Member	Law Society of Singapore
Ms Elaine Tan	Chairperson, IT Committee	Law Society of Singapore

Annex B

Participants in Legal Technology Vision Retreat

NAME	TITLE	ORGANISATION
LEGAL TECHNOLOGY COMMITTEE MEMBERS		
Mr Rakesh Kirpalani	Director	Drew & Napier LLC
Mr Adrian Peh	Managing Director	Yeo-Leong & Peh LLC
Mr Jeffrey Lim	Partner	WongPartnership LLP
Mr Steven Liew	Executive Director	APCO Worldwide
Mr Michael Tan	Head of Legal, Southeast Asia and India Legal Partnerships	Google Singapore
Ms Serene Wee	Chief Executive	Singapore Academy of Law
Mr Foo Nian Chou	Senior Director	Singapore Academy of Law
REPRESENTATIVES FROM STAKEHOLDERS		
Justice Belinda Ang	Chairperson	Singapore Mediation Centre
Ms Kelly Ho	Practitioner	Kel LLC
Ms Faith Sing	Practitioner	fsLAW LLC
Ms Michelle Woodworth	Partner	RHT Law
Ms June Lim	Managing Director	Eden Law Corporation
Mr Rajan Chettiar	Founder and Director	Rajan Chettiar LLC
Mr Han Kok Juan	Deputy Secretary	Ministry of Law
Ms Gloria Lim	Director / Registrar	Ministry of Law
Ms Sabiha Shiraz	Deputy Executive Director	Singapore Mediation Centre

Annex B

Participants in Legal Technology Vision Retreat

NAME	TITLE	ORGANISATION
Mr Kevin Nash	Deputy Registrar & Centre Director	Singapore International Arbitration Centre
Ms Eunice Chua	Deputy Chief Executive Officer	Singapore International Mediation Centre
Mr Senthilkumaran s/o Sabapathy	Justices' Law Clerk	Supreme Court
Ms Sarah Chua	Justices' Law Clerk	Supreme Court
Mr James Elisha Lee	Assistant Registrar	Supreme Court
RESEARCH TEAM		
Mr Wong Thai Chuan	Justices' Law Clerk	Supreme Court
Mr Chua Wei Yuan	Justices' Law Clerk	Supreme Court
Mr Ang Tze Siong	Justices' Law Clerk	Supreme Court
Mr Tan Zhongshan	State Counsel / Deputy Public Prosecutor	Attorney-General's Chambers
Mr David Lee	Director / Deputy Senior State Counsel	Attorney-General's Chambers
Mr Tan Sze Yao	Deputy Senior State Counsel	Attorney-General's Chambers
Mr Wilbur Lua	State Counsel	Attorney-General's Chambers

Annex B

Participants in Focus Group and Consultation Sessions

NAME	TITLE	ORGANISATION
Ms Gloria Lim	Director / Registrar	Ministry of Law
Ms Celia Sia	Programme Director	Ministry of Law
Mr Lim Joo Hong	Assistant Head	Ministry of Law
Ms Sarah Sim	Senior Officer	Ministry of Law
Ms Ellis See	Deputy Director	Ministry of Law
Mr Zaid Hamzah	Chief Executive	Law Society of Singapore
Ms Delphine Loo Tan	Director	Law Society of Singapore
Ms Virginia Anne Isaac	Project Manager	Law Society of Singapore
Ms Stephanie Lim	Project Manager	Law Society of Singapore
Ms Juthika Ramanathan	Chief Executive	Supreme Court
Mr Joseph Yew	Cluster Director	GovTech Singapore
Ms Shirlynn Loo	Director	Supreme Court
Mr Santhanam Srinivasan	Director	Supreme Court
Mr Wong Taur-Jiun	President	Singapore Corporate Counsel Association
Ms Mel Nirmala	Executive Director	Singapore Corporate Counsel Association
Mr Loong Seng Onn	Executive Director	Singapore Mediation Centre
Ms Sabiha Shiraz	Deputy Executive Director	Singapore Mediation Centre
SG Lionel Yee	Solicitor-General	Attorney-General's Chambers
Ms Tan Su-Yin	Chief Operating Officer / Chief Information Officer	Attorney-General's Chambers

Annex B

Participants in Focus Group and Consultation Sessions

NAME	TITLE	ORGANISATION
Ms Felicia Tan	Director	Incisive Law LLC
Mr Tan Wee Kio, Terence	Senior Associate	Drew & Napier LLC
Mr Rengarajoo B	Sole Proprietor	B Rengarajoo & Associates
Mr Yap Teong Liang	Director	TL Yap & Associates
Ms Tan Siew Kim	Consultant	Kalco Law LLC
Ms Rina Kalpanath Singh	Director	Kalco Law LLC
Ms Shahira Binte Mohd Anuar	Associate	Tan Kok Quan Partnership
Mr Ahmad Nizam Abbas	Director	Straits Law Practice
Ms Lisa Sam	Sole Proprietor	Lisa Sam & Co
Mr Goh Kok Yeow	Head	De Souza Lim & Goh LLP
Mr Petrus Huang	Director	Drew & Napier LLC
Ms Jo-ann See	Director	Amica Law
Mr Soh Kar Liang	Managing Director	Ella Cheong Asia
Mr Samuel Chacko	Director	Legis Point LLC
Ms Ang Keng Lee	Partner	Ramdas & Wong
Ms Selina Chin	Director	Foo & Quek LLC
Ms Rebecca Tai	Senior Legal Counsel	Brightoil Petroleum Pte Ltd
Ms Serena Lim	Chief Executive Officer	Bizibody
Mr Chee Chun Woei	Director	Mozaic Law

Annex B

Participants in Focus Group and Consultation Sessions

NAME	TITLE	ORGANISATION
Mr Foo Ji Bin	Technical Director	Ecquaria Technologies Pte Ltd
Mr Hendra Sutanto Poh	Technical Consultant	Ecquaria Technologies Pte Ltd
Mr William Sng	Account Manager	Nova
Ms Joyce Wong	Executive Vice President, General Manager	Nova
Mr Nicholas Wee	Chief Architect	CrimsonLogic Pte Ltd
Ms Neelima Pamulapati	Assistant Manager	CrimsonLogic Pte Ltd
Mr Hoong Teng Leng	Director	NCS Pte Ltd
Mr Zhao Wei	Associate Director	NCS Pte Ltd
Ms Julia Yeong	Director	xEdge Pte Ltd
Mr Bruce Lee	Technical Manager	xEdge Pte Ltd
Ms Cherilyn Tan	Chief Executive Officer	Asia Law Network
Mr Steven Liew	Private Investor and Start-up Mentor	Asia Law Network
Mr Chang Zi Qian	Co-Founder	Intelllex
Ms Felicia Ng	Chief, People Operations & External Relations	Intelllex
Mr Norvin Chan	Co-Founder	Lex Quanta
Mr Khoo Yong Jie	Co-Founder	Lex Quanta
Mr Jerrold Soh	Co-Founder	Lex Quanta
Mr Bu Fan	Co-Founder	Lex Quanta
Mr Ji En	-	Alt+Law Group
Mr Yap Jia Qing	-	Alt+Law Group

ISBN 978-981-11-2202-6