

OREGON
LAW
REVIEW

2015

VOLUME 93

NUMBER 4

Articles

PAUL LIPPE, DANIEL MARTIN KATZ & DAN JACKSON*

Legal By Design: A New Paradigm
for Handling Complexity in Banking
Regulation and Elsewhere in Law

Introduction832

I. The Rise of Legal Complexity834

 A. RRP Groundwork.....834

 B. Complexity in Bank Regulation: Living Wills.....836

II. Design Principles in Law.....841

 A. What Does “Design” Mean to the Legal
 Profession?841

 B. Applying Design Principles in the Modern
 Regulatory Context842

* Paul Lippe is the chief executive officer of OnRamp Systems and former general counsel of Synopsys. Daniel Martin Katz is an associate professor of law at Michigan State University and chief strategy officer at LexPredict. Dan Jackson is the executive director of the NuLawLab at Northeastern University School of Law.

C.	Case Study: Design of an Integrated RRP Solution	844
D.	The MOLA Approach	845
III.	Technological Approaches to Legal Complexity: Machine Learning and IBM Watson	846
A.	The Nature of Information in Law and the Need for Human & Technology Ensembles.....	847
B.	Legal Work Product as a Finance and Accounting Object.....	848
C.	Proposed Technology Development Trajectory.....	849
D.	Challenges in the Proposed Technological Developments.....	849
	Conclusion.....	850

INTRODUCTION

On August 5, 2014, the Federal Reserve Board (Fed) and the Federal Deposit Insurance Corporation (FDIC) criticized shortcomings in the Resolution Plans of the first Systemically Important Financial Institution (SIFI) filers.¹ In his public statement, FDIC Vice Chairman Thomas M. Hoenig said, “[E]ach plan [submitted by the first eleven filers] is deficient and fails to convincingly demonstrate how, in failure, any one of these firms could overcome

¹ Resolution Plans are reports—also known as “living wills”—that particular large banks and financial institutions must provide to the Fed and FDIC; the reports specify “the company’s strategy for rapid and orderly resolution in the event of material financial distress or failure of the company.” *Resolution Plans*, BD. OF GOVERNORS OF THE FED. RESERVE SYS., <http://www.federalreserve.gov/bankinforeg/resolution-plans.htm> (last updated Mar. 26, 2015). For more information including critiques of the SIFI designation, see MARC LABONTE, CONG. RESEARCH SERV., SYSTEMICALLY IMPORTANT OR “TOO BIG TO FAIL” FINANCIAL INSTITUTIONS (2014), available at <https://www.fas.org/sgp/crs/misc/R42150.pdf>; Press Release, Bd. of Governors of the Fed. Reserve Sys. & Fed. Deposit Ins. Corp., Agencies Provide Feedback on Second Round Resolution Plans of “First-Wave” Filers (Aug. 5, 2014) [hereinafter Board & FDIC Press Release], available at <http://www.federalreserve.gov/newsevents/press/bcreg/20140805a.htm>; James B. Thomson, *On Systemically Important Financial Institutions and Progressive Systemic Mitigation*, FED. RESERVE BANK OF CLEVELAND POLICY, DISCUSSION PAPERS, Aug. 2009, at 1; DOUGLAS J. ELLIOTT & ROBERT E. LITAN, BROOKINGS INST., IDENTIFYING AND REGULATING SYSTEMICALLY IMPORTANT FINANCIAL INSTITUTIONS: THE RISKS OF UNDER AND OVER IDENTIFICATION AND REGULATION (2011), available at http://www.brookings.edu/~media/research/files/papers/2011/1/16-regulating-sifis-elliott-litan/0116_regulating_sifis_elliott_litan.pdf; Christian Weistroffer, *Identifying Systemically Important Financial Institutions (SIFIs)*, DEUTSCHE BANK RESEARCH, Aug. 11, 2011, at 1.

obstacles to entering bankruptcy without precipitating a financial crisis.”²

The first eleven SIFIs—Bank of America, Bank of New York Mellon, Barclays, Citigroup, Credit Suisse, Deutsche Bank, Goldman Sachs, JPMorgan Chase & Co., Morgan Stanley, State Street Corporation, and UBS—include some of the largest organizations in the world, with sophisticated internal and external teams of professional advisors. According to Jamie Dimon of JPMorgan Chase, in 2013, it took 500 professionals more than one million hours per year to produce their institution’s annual Resolution Plan.³ With regulatory pressure increasing, that number is likely to rise, or at least remain constant, across first-wave filers, and it suggests significant spending by all filers.

So why were the plans criticized despite heavy compliance investment? The Fed and the FDIC identified two common shortcomings across the first eleven SIFI filers:

- (i) assumptions that the agencies regard as unrealistic or inadequately supported, such as assumptions about the likely behavior of customers, counterparties, investors, central clearing facilities, and regulators, and (ii) the failure to make, or even to identify, the kinds of changes in firm structure and practices that would be necessary to enhance the prospects for orderly resolution.⁴

This regulatory response highlights, in part, the need for lawyers (and other advisors) to develop approaches that can better manage complexity, encompassing modern notions of design, use of technology, and management of complex systems.

In this Article, we will describe the information-mapping aspects of the resolution planning challenge as an exemplary Manhattan Project⁵ of law: a critical enterprise that will require and trigger the development of new tools and methods for lawyers to apply when handling complex problems without unsustainably swelling the workforce and wasting resources. Fortunately, a significant amount of the technology and

² Thomas M. Hoenig, Vice Chairman, Fed. Deposit Ins. Corp., Credibility of the 2013 Living Wills Submitted by First Wave Filers (August 5, 2014) [hereinafter Hoenig Statement], available at <https://www.fdic.gov/news/news/speeches/spaug0514a.html>.

³ Matt Levine, *JPMorgan Is Keeping Busy*, BLOOMBERGVIEW (Apr. 10, 2014, 5:35 PM), <http://www.bloombergview.com/articles/2014-04-10/jpmorgan-is-keeping-busy>.

⁴ Board & FDIC Press Release, *supra* note 1.

⁵ The Manhattan Project was the United States’ massive effort to develop an atomic bomb during World War II. See generally *Manhattan Project*, WIKIPEDIA, http://en.wikipedia.org/wiki/Manhattan_Project (last visited Mar. 27, 2015).

process necessary to pursue this approach has already been developed by innovative Silicon Valley legal departments and applied by leading banks. Consistent with Dodd-Frank's⁶ focus on reorganizing and simplifying banks, we will focus here on the information architecture issues which underlie much of what is changing about how law and legal work product is delivered, not just for resolution planning, but more broadly.

I

THE RISE OF LEGAL COMPLEXITY

A. *RRP Groundwork*

The resolution and recovery planning (RRP) challenge is emblematic of the exponential rise of legal complexity that has unfolded over recent centuries. Complexity in law is, in part, a response to the increasing complexity of social interactions and economic exchanges in society. According to Philip R. Wood, the “disproportionate increase in size and complexity of the legal regime makes the law inaccessible and therefore directly causes unwarranted legal risk.”⁷ Solving complex (but single instance) legal problems is the hallmark of *bespoke* legal work.⁸ Over the past decades, various institutions have confronted increasing legal complexity by assigning larger and larger numbers of highly paid human reasoners in an effort to meet new challenges.⁹ However, in many instances, the growth of legal complexity appears to be outpacing the scalability of an approach that relies exclusively or in substantial part on human experts and the ability of the client to absorb and act on the advice given.¹⁰ This

⁶ Dodd Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376–2223 (2010) (codified at 12 U.S.C. §§ 5301–5641 (2012)).

⁷ Philip R. Wood, *International Legal Risk for Banks and Corporates*, ALLEN & OVERY GLOBAL LAW INTELLIGENCE UNIT 33 (Apr. 2014), http://www.allenoverly.com/SiteCollectionDocuments/GLIU_-_International_legal_risk_volume_1.pdf.

⁸ Richard Susskind, *From Bespoke to Commodity*, LEGAL TECH. J. (2006), <http://www.legaltechnologyjournal.co.uk/content/view/21/51/>; see also RICHARD SUSSKIND, THE END OF LAWYERS? RETHINKING THE NATURE OF LEGAL SERVICES 29 (2008) (describing bespoke legal service as that which is “specifically written for one client or customer”).

⁹ See William D. Henderson, *From Big Law to Lean Law*, 38 INT’L REV. L. & ECON. 5 (2013); see also BRUCE MACEWEN, GROWTH IS DEAD: NOW WHAT? LAW FIRMS ON THE BRINK (2013); Daniel Martin Katz, *The MIT School of Law? A Perspective on Legal Education in the 21st Century*, 2014 U. ILL. L. REV. 1431; Daniel Martin Katz & Michael J. Bommarito II, *Measuring the Complexity of the Law: The United States Code*, 22 ARTIFICIAL INTELLIGENCE & L. 337 (2014).

¹⁰ See Katz, *supra* note 9. See generally J.B. Ruhl & Daniel Martin Katz, *Measuring, Monitoring, and Managing Legal Complexity*, 100 IOWA L. REV. (forthcoming 2015).

complexity is particularly true in multiple and related matters, most notably those driven by technological innovation and connectivity.

As the size and complexity of tasks continues to grow, the economics of legal work are beginning to shift.¹¹ It has become increasingly necessary to reconfigure legal work to treat technology as a “force multiplier,” as has happened in almost all other fields. In the legal services industry, we are beginning to see the rise of more legal technology companies and, to a lesser extent, law firms offering alternative business models.¹² In civil litigation, for example, the sheer

¹¹ See, e.g., MITCHELL KOWALSKI, *AVOIDING EXTINCTION: REIMAGINING LEGAL SERVICES FOR THE 21ST CENTURY* (2012); Clark D. Cunningham, *Should American Law Schools Continue to Graduate Lawyers Whom Clients Consider Worthless?*, 70 MD. L. REV. 499 (2011); Heidi K. Gardner & Silvia Hodges Silverstein, *GlaxoSmithKline: Sourcing Complex Professional Services* (Harvard Bus. Sch. Case 414-003, rev. 2014), available at <http://www.hbs.edu/faculty/Pages/item.aspx?num=45646>; Daniel Martin Katz, *Quantitative Legal Prediction—or—How I Learned to Stop Worrying and Start Preparing for the Data-Driven Future of the Legal Services Industry*, 62 EMORY L.J. 909 (2013); Milton C. Regan, Jr. & Palmer T. Heenan, *Supply Chains and Porous Boundaries: The Disaggregation of Legal Services*, 78 FORDHAM L. REV. 2137 (2010); Larry E. Ribstein, *The Death of Big Law*, 2010 WIS. L. REV. 749; Larry E. Ribstein, *Delayering the Corporation*, 2012 WIS. L. REV. 305; William H. Simon, *Where Is the “Quality Movement” in Law Practice?*, 2012 WIS. L. REV. 387; Alex Hamilton & Kevin Colangelo, *Making LPO Work*, OUTSOURCE MAG., July 3, 2012, at 62, available at <http://outsourcemagazine.co.uk/making-lpo-work/>.

¹² See, e.g., Jessica Bruder, *A Start-Up Rethinks the Process of Getting a Trademark*, N.Y. TIMES (Apr. 11, 2012), <http://boss.blogs.nytimes.com/2012/04/11/a-start-up-re-thinks-the-process-of-getting-a-trademark/>; Sharon Driscoll, *A Positive Disruption: The Transformation of Law Through Technology*, STANFORD LAW. (June 4, 2013), <http://stanfordlawyer.law.stanford.edu/2013/06/a-positive-disruption/>; Scott Kirsner, *Start-Ups Take on Tough Customers: Lawyers*, BOS. GLOBE (Sept. 1, 2013), <http://www.bostonglobe.com/business/2013/08/31/tech-start-ups-target-tough-customer-law-firms/fyznk5CXkhnCqQzHpGEIGO/story.html>; Farhad Manjoo, *Will Robots Steal Your Job?*, SLATE (Sept. 29, 2011, 2:42 AM), http://www.slate.com/articles/technology/robot_invasion/2011/09/will_robots_steal_your_job_5.html; John Markoff, *Armies of Expensive Lawyers, Replaced By Cheaper Software*, N.Y. TIMES (Mar. 4, 2011), http://www.nytimes.com/2011/03/05/science/05_legal.html; Cari Sommer, *How Entrepreneurship Is Reshaping the Legal Industry*, FORBES (July 24, 2013, 11:46 AM), <http://www.forbes.com/sites/carissommer/2013/07/24/how-entrepreneurship-is-reshaping-the-legal-industry/>; Ansel Halliburton, *Judicata Raises \$5.8M Second Round to Build Out Advanced Legal Research Systems*; Keith Rabois Joins Board, TECHCRUNCH (May 28, 2013), <http://techcrunch.com/2013/05/28/judicata-raises-5-8m-second-round-to-build-out-advanced-legal-research-systems-keith-rabois-joins-board/>; Ansel Halliburton, *YC-Backed Casetext Takes a New Angle on Value Added Legal Research with Wikipedia-Style User Annotations*, TECHCRUNCH (Aug. 12, 2013), <http://techcrunch.com/2013/08/12/yc-backed-casetext-takes-a-new-angle-on-value-added-legal-research/>; Ansel Halliburton, *YC-Backed SimpleLegal Reduces Legal Bills with Machine Learning*, TECHCRUNCH (Aug. 6, 2013), <http://techcrunch.com/2013/08/06/yc-backed-simplelegal-reduces-legal-bills-with-machine-learning/>; Amir Kurtovic, *St. Louis Startup Juristat Wants to Analyze and Predict Behavior*

volume of information that must be reviewed during the discovery process has forced lawyers to leverage increasingly sophisticated forms of technology.¹³ In that context, as is the case in many other contexts, the gap between existing methods and ballooning imperatives has forced lawyers (and ultimately their clients) to search for alternative approaches to managing problems of large-scale and significant complexity.¹⁴

B. Complexity in Bank Regulation: Living Wills

The Dodd-Frank Act is a noteworthy example of regulation designed to respond to the complexity of modern industry. It is also an example of a regulatory approach that challenges the capacity of the legal profession to scale to the task. One requirement in Dodd-Frank—and in similar requirements around the world¹⁵—is for “living wills,” by which all large banks (SIFIs) must develop a Resolution Plan, explaining how they could either be broken up or survive the failure of one part of the institution.¹⁶ The living will is effectively a roadmap and simulation of the largest possible series of transactions in a bank’s lifetime, the type of analytical exercise that is common in electronic

of Judges, Trial Lawyers, ST. LOUIS BUS. J. (Feb 26, 2013, 11:00 AM), <http://www.bizjournals.com/stlouis/blog/BizNext/2013/02/st-louis-startup-juristat-wants-to.html?page=all>; Ryan Lawler, *UpCounsel Is a Marketplace to Connect Small Businesses with Affordable Legal Help*, TECHCRUNCH (July 24, 2013), <http://techcrunch.com/2013/07/24/upcounsel/>.

¹³ Electronic discovery (e-discovery), probably the most mature application of technology in the legal industry, is following what may be a typical development cycle: in stage one, technology supported information management; in stage two, search; in stage three, introduced analytics (so-called predictive coding); and in stage four, technology supports real-time monitoring and integration with ongoing, related systems. Stage four can be thought of as the discovery/compliance convergence.

¹⁴ Beyond the RRP challenge, there are a number of approaches being undertaken to help navigate complexity. In all cases, the question is to determine the optimal ensemble of people, process, and technology necessary to complete the respective task.

¹⁵ James Titcomb, *Banks Respond to Ring-Fence Plans*, TELEGRAPH (Jan. 3, 2015), <https://uk.finance.yahoo.com/news/banks-respond-ring-fence-plans-201524291.html>; Memorandum from Jay M. Goffman et al., Skadden, Dodd-Frank, FDIC and FSA Rules Require Financial Companies to Develop Global Insolvency Contingency Plans (Sept. 23, 2011), http://www.skadden.com/newsletters/Dodd-Frank_FDIC_and_FSA_Rules_Require_Financial_Companies_to_Develop_Global_Insolvency_Contingency_Plans.pdf.

¹⁶ Jessica Silver-Greenberg & Nelson D. Schwartz, *‘Living Wills’ for Too-Big-to-Fail Banks are Released*, N.Y. TIMES (July 3, 2012), http://www.nytimes.com/2012/07/04/business/living-wills-of-how-to-unwind-big-banks-are-released.html?_r=0; Noam Noked, *Examining the Application of Title I of the Dodd-Frank Act*, HARVARD LAW SCH. FORUM ON CORPORATE GOVERNANCE AND FIN. REGULATION (May 15, 2013, 9:20 AM), <http://blogs.law.harvard.edu/corpgov/2013/05/15/examining-the-application-of-title-i-of-the-dodd-frank-act/>.

systems design or software testing, but unprecedented in law. Section 165(d) of Dodd-Frank, 12 U.S.C. § 5365(d), requires each nonbank financial company supervised by the Fed, and each bank holding company with assets of \$50 billion or more, to report periodically to the Fed, the FDIC, and the Financial Stability Oversight Council, an interagency supervisory body created by Dodd-Frank.¹⁷ The report must include the company's plan for rapid and orderly resolution in the event of material financial distress or failure and the nature and extent of credit exposures.¹⁸

Section 165(d)(8) of Dodd-Frank requires the Fed and the FDIC to issue joint final rules implementing section 165(d) no later than January 21, 2012. The proposed rules were issued in April 2011,¹⁹ with comments due June 10, 2011. The final rules were published in November 2011.²⁰ While the final rules essentially replicated the proposed versions, the agencies deferred finalizing the credit exposure reporting requirement in order to coordinate the development of these reports with "single counterparty credit exposure limit[s]" that were still under consideration.²¹ The required credit exposure reports would provide important information for risk management and planning processes by identifying the company's significant credit exposures and other key information.²² The Fed proposed single counterparty credit limits for foreign banking organizations and foreign nonbank financial companies in December 2012.²³

¹⁷ Dodd-Frank Wall Street Reform and Consumer Protection Act, Pub. L. No. 111-203, 124 Stat. 1376-2223 (2010) (codified at 12 U.S.C. §§ 5301-5641 (2012)); Noked, *supra* note 16; Steve Quinlivan, *FDIC Adopts Proposed Rules for "Living Wills" and Credit Exposure Reports*, DODD-FRANK.COM (Mar. 29, 2011), [http://dodd-frank.com/fdic-adopts-proposed-rules-for-\"living-wills\"-and-credit-exposure-reports/](http://dodd-frank.com/fdic-adopts-proposed-rules-for-\).

¹⁸ Dodd-Frank Wall Street Reform and Consumer Protection Act § 115(d)(1)–(2).

¹⁹ See FDIC Resolution Plans and Credit Exposure Reports Required, 76 Fed. Reg. 22,648 (proposed Apr. 22, 2011) (to be codified at 12 C.F.R. pts. 243, 381).

²⁰ FDIC Resolution Plans Required, 76 Fed. Reg. 67,323 (Nov. 1, 2011) (codified at 12 C.F.R. pts. 243, 381).

²¹ *Id.* at 67,327. For a discussion and explanation of single counterparty credit limits, see *A Closer Look: The Dodd-Frank Wall Street Reform and Consumer Protection Act*, PWC (Apr. 2012), https://www.pwc.com/en_US/us/financial-services/regulatory-services/publications/assets/pwc-a-closer-look-sifi-standards-secure.pdf.

²² Proposed rules governing, inter alia, single counterparty credit limits were proposed by the Federal Reserve in January 2012. See *Enhanced Prudential Standards and Early Remediation Requirements for Covered Companies*, 77 Fed. Reg. 594, 600 (proposed Jan. 5, 2012) (to be codified at 12 C.F.R. §§ 252.91–97).

²³ See *Enhanced Prudential Standards and Early Remediation Requirements for Foreign Banking Organizations and Foreign Nonbank Financial Companies*, 77 Fed. Reg. 76,628, 76,679 (proposed Dec. 28, 2012) (to be codified at 12 C.F.R. pt. 252). As of March 16, 2015,

The final rules require a strategic analysis by the company of how it can be “resolved” under the Bankruptcy Code, chapter eleven of the United States Code (or an insolvency regime other than the Bankruptcy Code), in a way that would not pose systemic risk to the financial system.²⁴ In doing so, the company must map its business lines to material legal entities and provide integrated analyses of its corporate structure; credit and other exposures; funding, capital, and cash flows; operations in domestic and foreign jurisdictions; and, significantly, supporting information systems for core business lines and critical operations.²⁵

With respect to the type of information that can be gathered from contracts to which a company is a party, the regulations require detailed reporting from a variety of perspectives, including:

Provide a detailed description of the processes the covered company employs for: (i) Determining the current market values and marketability of the core business lines, critical operations, and material asset holdings of the covered company; (ii) Assessing the feasibility of the covered company’s plans (including timeframes) for executing any sales, divestitures, restructurings, recapitalizations, or other similar actions contemplated in the covered company’s resolution plan; and (iii) Assessing the impact of any sales, divestitures, restructurings, recapitalizations, or other similar actions on the value, funding, and operations of the covered company, its material entities, critical operations and core business lines.²⁶

...

Each resolution plan shall: . . . (10) Identify the major counterparties of the covered company and describe the interconnections, interdependencies and relationships with such major counterparties; (11) Analyze whether the failure of each major counterparty would likely have an adverse impact on or result in the material financial distress or failure of the covered company; and, (12) Identify each trading, payment, clearing, or settlement system of which the covered company, directly or indirectly, is a member and on which the

these rules have not been finalized. *See Enhanced Prudential Standards and Early Remediation Requirements for Foreign Banking Organizations and Foreign Nonbank Financial Companies (Docket R-1438)*, REGULATIONS.GOV, <http://www.regulations.gov/#!documentDetail;D=FRS-2013-0058-0001> (last visited Mar. 27, 2015).

²⁴ Press Release, Bd. of Governors of the Fed. Reserve Sys. (Oct. 17, 2011), available at <http://www.federalreserve.gov/newsevents/press/bcreg/20111017a.htm> (“The final rule requires bank holding companies with assets \$50 billion or more and nonbank financial firms designated by the Financial Stability Oversight Council for Supervision by the Board to annually submit resolution plans to the Board and the Federal Deposit Insurance Corporation.”).

²⁵ 12 C.F.R. §§ 243.4, 381.4 (2014); *see* Quinlivan, *supra* note 17.

²⁶ 12 C.F.R. § 243.4(c)(5).

covered company conducts a material number or value amount of trades or transactions. Map membership in each such system to the covered company's material entities, critical operations and core business lines.²⁷

...

To the extent not elsewhere provided, identify and map to the material entities the interconnections and interdependencies among the covered company and its material entities, and among the critical operations and core business lines of the covered company that, if disrupted, would materially affect the funding or operations of the covered company, its material entities, or its critical operations or core business lines. Such interconnections and interdependencies may include: (1) Common or shared personnel, facilities, or systems (including information technology platforms, management information systems, risk management systems, and accounting and recordkeeping systems); (2) Capital, funding, or liquidity arrangements; (3) Existing or contingent credit exposures; (4) Cross-guarantee arrangements, cross-collateral arrangements, cross-default provisions, and cross-affiliate netting agreements; (5) Risk transfers; and (6) Service level agreements.²⁸

These regulatory reporting requirements—and comparable requirements internationally—assumed that banks had much more comprehensive information about their operations than they in fact did. Consequently, RRP is leading banks to perform a comprehensive, detailed review of all contracts to which a covered company is a party with an eye to identifying, evaluating, and quantifying all material financial and operational risks arising out of those contracts. In essence, the regulations require a complete cataloguing of a covered company's contracts along with a risk assessment for each contract that can then be mapped to the company's operations and core business lines.²⁹

²⁷ *Id.* § 243.4(e).

²⁸ *Id.* § 243.4(g).

²⁹ As a result of their review of the 2012 Plan, the agencies have identified an initial set of significant Obstacles to Rapid and Orderly Resolution. Each obstacle should be discussed in its own section of the narrative. The obstacles are: (1) “[t]he risk that services provided by an affiliate or third party might be interrupted, or financial market utility (‘FMU’) access and/or payment and clearing capabilities might be lost;” (2) “an affiliate or third party might fail to perform service level agreements;” (3) “the Covered Company might experience interruption or loss of data and IT services;” (4) “liquidation of a counterparty might negatively impact the Covered Company’s operations;” (5) “cross-default provisions might be exercised;” and (6) “a counterparty might exercise contract rejection powers or might be excused from the continued provision of rights which are available to a counterparty under applicable law or by contract.” FED. DEPOSIT INS. CORP. & BD. OF GOVERNORS OF THE FED. RESERVE SYS., GUIDANCE FOR 2013 § 165(D) ANNUAL RESOLUTION PLAN SUBMISSIONS BY DOMESTIC COVERED COMPANIES THAT SUBMITTED INITIAL

While many regulators, and perhaps even many senior executives, imagine that banks and other large institutions naturally have systems in place to manage this key legal information, experience suggests otherwise. One lesson of the financial crisis was that many risks were undetected for lack of systematized management of key legal information, and perhaps as importantly, potential disposition of assets was delayed. The Dodd-Frank Act seeks to protect national and international financial systems by identifying and mitigating these risks through structural information and remediation before institutional failure. Unlike regulatory regimes designed to control bank size, the living will regime aims to create a system in which large and highly financially networked banks can fail *despite* their size. In a world in which many politicians and regulators are moving toward more stringent size and capital limits on banks,³⁰ the notion that it would take too much work for a given SIFI to understand and manage its own complexity is not a satisfying or credible explanation for an inadequate Resolution Plan.³¹ If anything, it would appear that regulators would continue to push SIFIs until better practices emerge and become widely adopted, setting the bar higher and higher.³²

RESOLUTION PLANS IN 2012 §§ II.A.3-.4, II.B.2.d-e (n.d.), *available at* <http://www.doddfrankupdate.com/Resource.ashx?sn=FDICFed2013ResolutionPlanGuidanceforCertainDomesti>. The risk of counterparty actions, including derivative and repo unwinds, is of a volume sufficient to create operational challenges for the Covered Company or its FMUs and systemic market disruption or financial instability in the United States. The effects of these counterparty actions—both internally to the Covered Company and externally to counterparties and other affected parties—if the Material Entities were to enter resolution in a sequence other than that described in the previous subsection (e.g., increased complexity, cost, or delay client access to funds, failure occurring in middle of the week) are significant. Many arrangements would need to be made prior to the bankruptcy filing in order for the bankruptcy to proceed in a rapid and orderly fashion as provided in the Rule. *Id.*

³⁰ See, e.g., Victoria McGrane & Ryan Tracy, *Fed to Hit Biggest U.S. Banks with Tougher Capital Surcharge*, WALL ST. J. (Sept. 9, 2014), <http://online.wsj.com/articles/feds-tarullo-says-fed-board-will-unveil-systemically-important-financial-institution-surcharge-rule-soon-1410211114>.

³¹ The Fed and FDIC jointly require other information by rule or order. FDIC, FDIC STAFF SUMMARY OF CERTAIN PROVISIONS OF THE DODD-FRANK WALL STREET REFORM AND CONSUMER PROTECTION ACT § C, at 3 (2010), *available at* <https://www.fdic.gov/regulations/reform/summary.pdf>. “The Living Wills process has laid the groundwork to encourage each covered entity to focus on . . . [e]valuating and streamlining complex legal structures.” FDIC ADVISORY COMM. ON SYSTEMIC RESOLUTION, DODD-FRANK ACT TITLE I: LIVING WILLS OVERVIEW 4 (Jan. 25, 2012) [hereinafter LIVING WILLS OVERVIEW], *available at* https://www.fdic.gov/about/srac/2012/2012-01-25_living-wills.pdf.

³² The initial plans will provide the foundation for developing more robust annual resolution plans over subsequent years. LIVING WILLS OVERVIEW, *supra* note 31, at 6.

II DESIGN PRINCIPLES IN LAW

A. What Does “Design” Mean to the Legal Profession?

To fully understand the meaning we ascribe to “design” within this particular legal context, some basics are in order. As a verb, “design” connotes a *process* of creation.³³ This may be how most lawyers not affiliated with traditional design professions have recently encountered the term; processes originally developed by, and for, product designers are increasingly used for innovation in other professions.³⁴ These design methods include developing empathy through observation, cyclical iteration of ideas, prototyping, beta testing, and so on.³⁵

While this “design approach” to problem solving shows promise within the legal profession and legal education,³⁶ we are here using the term “design” more formally as a noun. As such, “design” describes object creation, manifested by an agent, to accomplish a goal or goals, where the object satisfies a set of requirements, and its creation is subject to certain fixed constraints.³⁷ Used in this traditional sense, the design “object” is a physical one, the agent is a human being (the *designer*), the goal is the purpose of the design exercise (*move this large object from here to there*), the set of requirements include material specifications (*use only found objects*), and the constraints are things such as available found materials (*stone and wood*). Thus, the first rudimentary wheel was not invented, but designed.

So, what exactly do we mean when we refer to design (as a noun) in the context of legal work, and specifically in the context of regulatory complexity such as that found in RRP? Used in this context, the objects to be created are the organizational changes contemplated by the Resolution Plan and the information needed to inform them, the goal is to “convincingly demonstrate how, in failure, [a SIFI] could overcome

³³ “To create, fashion, execute, or construct according to plan.” MERRIAM WEBSTER’S COLLEGIATE DICTIONARY 338 (11th ed. 2007).

³⁴ See, e.g., TIM BROWN & BARRY KATZ, CHANGE BY DESIGN: HOW DESIGN THINKING TRANSFORMS ORGANIZATIONS AND INSPIRES INNOVATION (2009).

³⁵ See, e.g., Ian Parker, *The Shape of Things to Come*, NEW YORKER (Feb. 23, 2015), <http://www.newyorker.com/magazine/2015/02/23/shape-things-come?intcid=mod-most-popular>.

³⁶ See, e.g., Cody Thornton, *Shared Visions of Design and Law in Professional Education*, 6 NE. U. L.J. 21 (2013).

³⁷ See, e.g., Paul Ralph & Yair Wand, *A Proposal for a Formal Definition of the Design Concept*, in DESIGN REQUIREMENTS ENGINEERING: A TEN-YEAR PERSPECTIVE 103 (Kalle Lyytinen et al. eds., 2009).

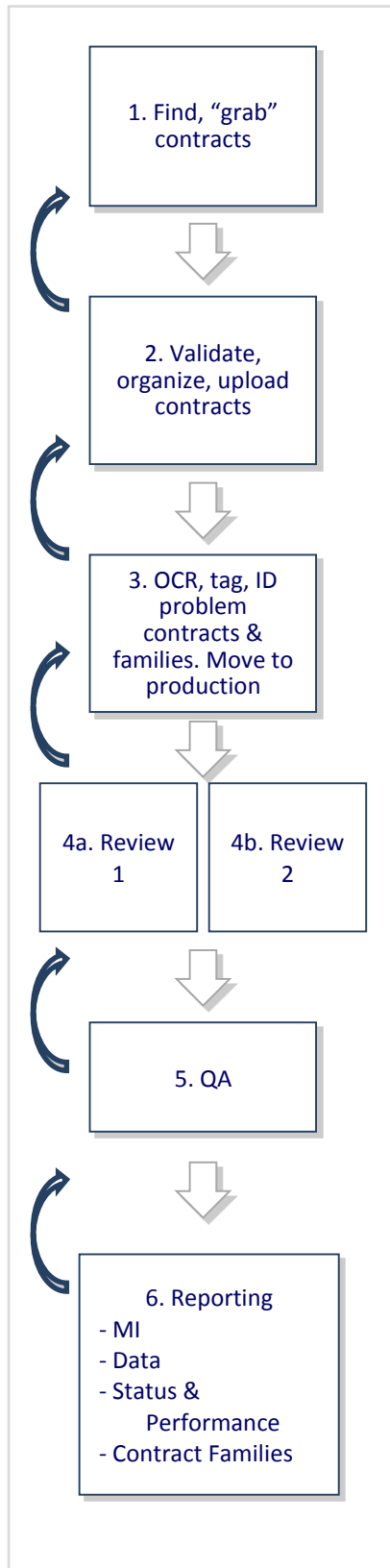
obstacles to entering bankruptcy without precipitating a financial crisis,”³⁸ and the set of requirements, or specifications, detailed here in Part II.A. But what of the “certain fixed constraints” cabining the actual creation of the Resolution Plan? Here is where a successful Resolution Plan is an exercise in legal design: Using new technology and alternative approaches to organize legal information can expand the available options well beyond what are initially seen as fixed constraints.

B. Applying Design Principles in the Modern Regulatory Context

Sophisticated lawyers have long recognized the disconnect between the way they create and access legal work product (e.g., documents and arguments) and the demands of complex organizations for systematic integration of processes and information (e.g., systems and data). To address growing scale and complexity, large organizations now need to “map” contracts and other legal work product to meet commercial and regulatory requirements to integrate and link document information into databases and processes. If they remain isolated, contracts will be a source of operational risk, with inevitable points of failure and high costs.

³⁸ Hoenig Statement, *supra* note 2.

on the management of operations and



systems, which are typically highly dependent on external suppliers. Formal written contracts define the operations and systems interactions. A typical SIFI may have 1000 suppliers and 10,000 contracts (with hundreds of thousands, if not millions, of total clauses contained therein). Each contract may relate to a different system, may have immaterial and material variances across the same supplier, may reflect a different template, may have originally been entered into by a different entity, may be subject to different national laws (and in some cases, written in different languages), may be stored or labeled in an inconsistent fashion, and may or may not be found in any of the SIFI's primary document repositories. To successfully develop a living will, the institution must both comprehensively capture and map this information and take concrete action based on the collected information (e.g., restructuring or amending). The numerous contracts that form the legal framework of major financial institutions—whether derivatives, commercial loans, or intangibles licenses—have outpaced twentieth century technology in scope and complexity, and they require new approaches.

C. Case Study: Design of an Integrated RRP Solution

One SIFI that is not in the first wave has approached RRP by applying design techniques developed by companies such as Cisco Systems and OnRamp Systems. An example of these design techniques is the “system flow” for contract analysis, which is further described below. We refer to this process as MOLA, or “Massive OnLine Legal Analysis.”

1. Capture or “grab” existing contracts.³⁹ This process is carefully managed and problems may be escalated back to the appropriate customer team. The source documents are typically electronic image files (PDF or other formats) and may not be in a searchable format. Older documents may be poor quality image files, but they still must be reviewed.
2. Contracts are initially checked for completeness, a folder structure for the contract family is created, and documents are uploaded into the Contract Review Service (CRS). Data on the number of contracts, the number of contract families, escalations,

³⁹ Existing contracts include all contracts, such as intercompany services and risk management agreements, vendor agreements, financial instruments, and insurance and reinsurance agreements.

- and similar metrics are captured. Contract family data is uploaded in a “grab report” spreadsheet that is automatically read by CRS, which then pre-populates certain data points.
3. Contracts are converted into searchable PDF format and further checked for missing pages, documents, or other errors. Contracts are tagged to provide a “flow-down” from parent to child contracts. Data on processing rates is captured and displayed on CRS dashboards.
 4. Reviews are initiated and completed. Questions and problems are resolved through a flag and escalation process. Two independent reviews are done for each contract. Data on throughput, review time, reviewer and question error rates, and more is captured online. Access to data is restricted to appropriate personnel.
 5. Completed reviews are then checked concurrently by quality assurance. Errors are reported and comments are captured for reviewer discussion. Throughput, status, and error rate data is captured for analysis and feedback to the team.
 6. Multiple types of reports are generated. Management information reports identify contracts and responses according to predefined criteria. Online reports support “drill-down” to the specific page of a contract. Performance and trend data can be exported to Excel, .CSV, SQL, or another appropriate data-reporting format. “Raw” data can be exported to Excel, .CSV, SQL, or another appropriate data-reporting format. The report generator allows very specific criteria, date range, etc., to be specified for report output.

D. The MOLA Approach

The MOLA process is conceptually similar to processes that have been used for almost two decades to address and solve extremely large, complex mathematical and scientific problems. IBM developed one of the best organized efforts—the World Community Grid—to conduct massive and complex research in a variety of areas, including cancer research, clean air studies, AIDS investigations, and other health-related projects. As described on its website, the “World Community Grid brings together people from across the globe to benefit humanity by creating the world’s largest non-profit computing grid . . . by pooling

surplus processing power from volunteers' devices."⁴⁰ In other words, the World Community Grid uses the Internet's capacity to link together literally millions of individual computers and other devices into one giant computing network. The system then manages that network by assigning to each individual computer only a very small piece of the much larger computing and analysis project, and it thereby becomes possible to solve exceedingly large, complex problems at a fraction of the cost that would be required if the problem was assigned to a single, large supercomputer.

As with the World Community Grid, MOLA breaks a large, data rich, and complex legal project into small pieces that can be assigned to individual attorneys for completion. Those small, individual solutions, when combined with thousands of other individual solutions, result in a cost-effective solution to the overarching larger project. In this way, the solution to the large legal project is built from the ground up using the results of thousands of small legal projects.

A critical feature of the MOLA process—making it particularly nimble and efficient in processing deep pools of data—is the array of quality control mechanisms. These devices are designed to reduce errors at the individual attorney level and to ensure consistency in analysis across the entire project. Errors or inconsistencies at the individual attorney level can, both individually and collectively, undermine the integrity of the overall analysis and solution. Quality control processes can include such things as careful selection of the individuals who work at the small legal project level, appropriate training and guidance for the individual attorneys, oversight mechanisms that can identify and correct errors, and feedback loops to those individual attorneys so that their work product improves over time.

III

TECHNOLOGICAL APPROACHES TO LEGAL COMPLEXITY: MACHINE LEARNING AND IBM WATSON

As part of his or her role in large institutions, one important value proposition offered by the elite twenty-first-century lawyer will be to participate in the development of systematic solutions to efficiently manage legal complexity and guide clients to informed decisions. As Mark Chandler, general counsel of Cisco, says, lawyers need to move

⁴⁰ *Forums*, WORLD CMTY. GRID, <http://www.worldcommunitygrid.org/help/viewTopic.do?shortName=forum> (last visited Mar. 16, 2015).

from being “gatekeepers . . . to build gateways.”⁴¹ In the RRP context, for example, it is impossible to make realistic assumptions, or to identify and make necessary structural changes, without a systematic understanding of complex enterprise structures, and the internal and external interrelatedness that drives them.

Without harnessing available technologies, lawyers are ill-equipped to handle the complexity of the modern legal landscape. New technology has begun to overcome traditional obstacles to technological intervention in the legal field, such as language-driven information structure and isolated data sources. In much the same way that analytics affect other industries, pathbreaking developments in artificial intelligence may provide the very assistance that is needed to combat problems that feature a wide scope and high levels of complexity. Best known for its win against the two greatest champions in the history of the television show “Jeopardy,” IBM Watson and other related technologies are now being applied to problems in medicine,⁴² finance,⁴³ and various other industries.⁴⁴

Although important questions remain about how technology can apply to law, technology presents a big opportunity for the legal industry. To support various efforts, including the application of IBM Watson and other related tools, it is important to cultivate the proper mix of substantive experts and those with expertise in legal informatics.

A. The Nature of Information in Law and the Need for Human & Technology Ensembles

While most legal information has some sort of structure, much of it is latent or not particularly useful. Historically, latency—or what might be called the open syntax of the law—has frustrated attempts to either

⁴¹ *Lawyers: Can't Live with Them, Can't Live Without Them?*, VESTED (Dec. 16, 2010), <http://www.vestedway.com/lawyers-cant-live-with-them-cant-live-without-them/>.

⁴² See Zina Moukheiber, *Mayo Clinic Turns to IBM'S Watson to Match Cancer Patients with Clinical Trials*, FORBES (Sept. 8, 2014, 8:00 AM), <http://www.forbes.com/sites/zinamoukheiber/2014/09/08/mayo-clinic-turns-to-ibms-watson-to-match-cancer-patients-with-clinical-trials/>; Paul Cerrato, *IBM Watson Finally Graduates Medical School*, INFO.WEEK (Oct. 23, 2012, 1:00 AM), <http://www.informationweek.com/health-care/clinical-information-systems/ibm-watson-finally-graduates-medical-school/d/d-id/1106982?>.

⁴³ Beth Jinks, *IBM's Watson Gets Wall Street Job After 'Jeopardy' Win*, BLOOMBERG BUS. (Mar. 6, 2012, 6:43 AM), <http://www.bloomberg.com/news/articles/2012-03-05/ibm-s-watson-computer-gets-wall-street-job-one-year-after-jeopardy-win>.

⁴⁴ *Use Watson*, IBM WATSON, <http://www.ibm.com/smarterplanet/us/en/ibmwatson/implement-watson.html/> (last visited Mar. 16, 2015).

fully or partially automate legal tasks. The most immediate use for this technology will be in helping large entities organize and harvest relevant information from existing legal work product (e.g., their large body of contractual agreements). Eventually such approaches could potentially benefit all entities regardless of size.

One distinct characteristic of IBM Watson (and other related technologies) is its ability to process large bodies of unstructured and semi-structured data and derive meaningful information therefrom. IBM Watson is particularly well-suited to problems involving Natural Language Processing (NLP) and is able to iteratively improve as it observes more information in its relevant domain. Legal projects such as contract review—that involve information identification and extraction—are particularly well positioned to benefit from these emerging technological tools in conjunction with human experts. With appropriate configuration, IBM Watson (and other related tools) could help the problem of resolution and recovery, and could yield substantial improvements in the efficiency and accuracy of underlying tasks by integrating with, rather than substituting for, lawyers.

In the RRP context, IBM Watson (and other related technologies) can enable:

- Greater lawyer efficiency,
- Lawyer training and work product checking,
- Ongoing training of IBM Watson by the lawyers, and
- Development of a methodology of “Sample and Simulate,” whereby a bank analyzes a subset of its relevant documents. The bank still trains Watson sufficiently on that subset so that it can very rapidly analyze the remaining documents as needed, or more quickly if regulators require comprehensive analysis.

B. Legal Work Product as a Finance and Accounting Object

Through contract, individuals and institutions memorialize their various rights, obligations, and potential liabilities. Across the set of all agreements to which an entity is a party (and third party), it is possible to describe the expected revenue or liability flowing from those agreements. External data can offer a contract-level characterization of the risk attendant to each revenue or liability stream. This is, of course, a finance and accounting question, but its formal expression is in contract. By abstracting the agreement review process for purposes of due diligence, the goal of the review process is to harvest substantively important legal information and memorialize that information

somewhere else, such as on a balance sheet. Thus, for many problems, finance and accounting's root origin is in contract (and other associated legal work product).

The Dodd-Frank Act requires that banks develop Resolution Plans to minimize systematic risks. Risk comes in a variety of forms, but in most cases, the set of all contracts describe the *interactome*—the whole set of interactions—within which overall risk is a function of each counterparty and each agreement. As the legal community applies tools that can map the vast complexity of these relationships, clients will be better prepared to tackle modern legal challenges, such as those posed by the Dodd-Frank Act.⁴⁵

C. Proposed Technology Development Trajectory

The goal of RRP analysis is to convert a contract into a pointable data object where the contract memorializes the set of rights and obligations that are attendant to that agreement. To attain this goal, institutions will need to:

1. Collect the set of all agreements held by a bank.
2. Identify each counterparty from those agreements (and third party where available).
3. Develop a model of counterparty risk which would include both an individual and systematic (ecosystem) component.
4. Determine the nature of resource (financial) flows attendant to each counterparty.
5. Convert each contract into a pointable data object, which allows its contents to be immediately memorialized in a balance sheet or other relevant IT system.
6. Offer the ability for key decision makers to query a system and run various scenarios in which some sort of aggregate or systematic risk could be the output.

D. Challenges in the Proposed Technological Developments

Although we believe the application of machine learning and natural language processing—as manifested in platforms such as IBM Watson and other related technologies—will likely improve the efficiency and

⁴⁵ Noked, *supra* note 16.

accuracy of various legal tasks,⁴⁶ we are acutely aware of the significant limits attendant to applying new technology to the challenging work that lawyers, accountants, and compliance officers undertake. The appropriate question is to determine what ensemble of humans and technology can most efficiently and accurately complete a given task. Certainly, this ensemble will require both humans and technology to work together, as neither alone is sufficient given the scale and complexity of the underlying task.

The review task is particularly important for banks and other financial institutions. Many institutions have a variety of nonstandardized legacy agreements and assumed agreements from institutional consolidation, particularly because of the recent financial crisis. The diversity of agreements that requires review makes the task even more challenging. Despite these and other challenges, we believe that the approach described herein can facilitate compliance, and more importantly, enable regulated banks to manage risks while successfully performing their vital economic functions.

The end product of this review should be the development of a truly digital, and then ultimately computational, contract whose relevant content can be *pointed* toward every other relevant financial and accounting system.⁴⁷ Not only will this digitization represent a general improvement in the quality of their information systems that can then be used to improve and streamline myriad business practices such as revenue recognition, but it can also serve as the backbone for banks to develop rigorous Resolution Plans that regulators will accept. Namely, with such data pipes in place, it is possible to run a variety of scenarios to determine the plausible range of potential outcomes. This sort of a “wargame” should provide key decision makers with a playbook that can be used in times of crisis, such as major financial institutional failure.

CONCLUSION

The complexity of global commerce and legal systems will continue to grow. Unlike most fields, law has been slow to embrace the tools and processes of managing increasing complexity. As a result, legal work has too often failed to prevent “catastrophic failures” because

⁴⁶ See Paul Lippe & Daniel Martin Katz, *10 Predictions About How IBM's Watson Will Impact the Legal Profession*, ABA J. (Oct. 2, 2014, 8:35 AM), http://www.abajournal.com/legalrebels/article/10_predictions_about_how_ibms_watson_will_impact.

⁴⁷ See generally Harry Surden, *Computable Contracts*, 46 U.C. DAVIS L. REV. 629 (2012).

