THE PAST, PRESENT, & FUTURE OF M&A – ASSESSING HOW THE LEAN PROCESS AND ARTIFICIAL INTELLIGENCE CAN REMEDY THE PITFALLS OF TRADITIONAL M&A

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Any sufficiently advanced technology is indistinguishable from magic.
– Arthur C. Clarke[1]

INTRODUCTION

Data is the new oil.[2] However, in the legal space, the ability to extract fundamental value and learn from this commodity has taken considerable time and resources. Traditionally, in mergers and acquisitions ("M&A"), compiling valuable information for a deal required manual review of thousands of documents.[3] Due to the time constraints of this document review, dealmakers working on diligence could not allocate sufficient attention to important objectives like learning from the successes and failures of past deals and creating integration plans. Now, as technology is adapting, there are opportunities for attorneys to benefit greatly from the efficiencies of newly developed tools. In a climate consisting of high deal volume – and the emergence of new legal technology – the question arises of what is now possible for traditional M&A in the digitalized world?[4] Particularly, how efficiencies and technology can make a meaningful difference at each step along the lifecycle of a deal.

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[1] ARTHUR C. CLARKE, *Profiles of the Future: An Inquiry into the Limits of the Possible* 36 (1984).

[2] *The World's Most Valuable Resource Is No Longer Oil, But Data*, ECONOMIST (May 6, 2017), https://www.economist.com/leaders/2017/05/06/the-worlds-most-valuable-resource-is-no-longer-oil-but-data.

[3] Joni Young, *M&A Technology to Turbocharge Your Transactions*, DELOITTE, https et. al., Deloitte, *Turbocharge Your Next Transaction*, M&A HOT TAKES, 2018 at 1, 3, https://www2.deloitte.com/us/en/pages/mergers-and-acquisitions/articles/m-and-a-technology-helps-speed-up-m-and-a-transactions.html..html (follow "Download the PDF" link).

[4] *See* Bruce C. Doeg, *Rethinking What is Possible in Mergers and Acquisitions*, BAKER DONELSON (July 28, 2020), https://www.bakerdonelson.com/rethinking-what-is-possible-in-mergers-and-acquisitions; *see generally* BAIN & COMPANY'S GLOBAL M&A AND DIVESTITURES PRACTICE, GLOBAL *M&A Report* 1 (BAIN & COMPANY, 2022) https://www.bain.com/insights/topics/m-and-a-report.29

The aim of this Article is to address this question yet also explore the past, present, and future of mergers and acquisitions. To begin, Part I will examine the history of M&A in the United States and track its six merger waves; specifically, the blockbuster deals of each period, the market trends, and the transactional approaches that developed over time. Part II, delving into traditional M&A, will detail the pitfalls encountered throughout the lifecycle of a deal. Part III will introduce and detail the Lean Methodology, and its potential for having an impact on M&A – starting with its development by the Toyota Motor Corporation and then examining its evolution into a lean process applied by global industry leaders. Part III then argues that the lean process can improve traditional M&A if an emphasis on production flow, management infrastructure, and continuous improvement culture is applied. Finally, Part IV defines artificial intelligence, provides its general benefits, and explores its further ability to revolutionize the future of dealmaking.

I. MERGERS AND ACQUISITIONS EVOLUTION

The history of mergers and acquisitions in the United States ("U.S.") is marked by six merger waves.[5] A merger wave – a period of higher merger activity – is typically caused by "economic, regulatory, and technological shocks."[6] Economic shocks are triggered by a company's expansion to meet the aggregate demands of a growing economy.[7] Regulatory shocks are produced by the removal of barriers that prevent corporate combinations.[8] Technological shocks are characterized by major technological improvements that transform industries.[9]

A. The First Merger Wave (1897–1904)

The first wave consisted of high merger activity in the manufacturing, mining, metals, petroleum, and food industries.[10] Often labelled as the "monopoly wave," most mergers were horizontal

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[5] PATRICK A. GAUGHAN, MERGERS, ACQUISITIONS, & CORPORATE RESTRUCTURINGS 41 (7th ed. 2018); *see* Mark L. Mitchell & J. Harold Mulherin, *The Impact of Industry Shocks on Takeover and Restructuring Activity*, 41 J. FIN. ECON. 193, 194 (1996).

[6] Gaughan, *supra* note 5, at 42.

[7] *Id.*

[8] *Id.*

[9] *Id.*

[10] Ralph L. Nelson, *Merger Movements in American Industry* 1895–1956), at 34 (1959).

combinations that created a monopolistic market structure.[11] Concurrently, the establishment of a national network of railroads allowed firms to reach broader markets and rethink what was possible for the development of their business – often merging with smaller producers to eliminate competition and maintain market share.[12] The first billion-dollar company was formed when J.P. Morgan merged Carnegie Steel and Federal Steel to create U.S. Steel.[13] Companies like U.S. Steel, American Tobacco, and Standard Oil monopolized their respective markets – giving rise to the statistics of approximately 3,000 companies disappearing and 300 mergers "controlling 40% of the nation's manufacturing capital."[14] Although most monopolies formed on the heels of the Sherman Antitrust Act of 1890 ("Sherman Act"), the court system initially focused on the regulation of stockholder trusts and, coupled with lax state corporation laws, provided no legal barriers for industrial giants to thrive.[15]

In 1904, however, the Supreme Court ruled against the Northern Securities Company, establishing that a merger resulting in market dominance constitutes a violation of the Sherman Act, whereas mergers of manufacturing firms had previously been protected from federal regulation. t.[16] The Court held the Sherman Act is designed to protect against this type of monopolistic merger which, if allowed, terminates the public's right to the benefits of free competition.[17] The

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[11] *Id.* at 103; *see* GAUGHAN, *supra* note 5, at 43.

[12] *See generally* George Bittlingmayer, *Did Antitrust Policy Cause the Great Merger Wave?*, 28 J.L. & ECON. 77, 100 (1985) (discussing how the growth and merger of industries, such as railroads, was influenced by antitrust policy in the late 1890s).

[13] *See The Founding of U.S. Steel and the Power of Public Opinion*, HARV. SCHOOL BUS., https://www.library.hbs.edu/us-steel/Exhibition/The-Founding-of-U.S.-Steel-and-the-Power-of-Public-Opinion (last visited Oct. 5, 2022).

[14] GAUGHAN, *supra* note 5, at 44; *see generally* George J. Stigler, *Monopoly and Oligopoly by Merger*, 40 AM. ECON. ASS'N 27–32 (1950) (discussing how mergers were an advantageous choice for growing companies in the late nineteenth and early twentieth centuries).

[15] GAUGHAN, *supra* note 5, at 44–45.

[16] N. Sec. Co. v. United States, 193 U.S. 197, 354–55, 360 (1904).

[17] *Id.* at 325, 357.

legal precedent of this Supreme Court ruling reduced horizontal merger activity and concluded the first merger wave.[18]

B. The Second Merger Wave (1916–1929)

As the economy flourished post-World War I, the consolidation of many industries created an oligopolistic market structure with an increase of vertical mergers.[19] Rather than companies aiming to increase market share through horizontal mergers, companies opted to use vertical integration to enhance the efficiency of their operations.[20] In 1914, Congress passed the Clayton Act, reinforcing the antimonopoly provisions of the Sherman Act and creating a strict antitrust enforcement structure.[21] The Clayton Act held that purchasing the stock of another firm is illegal if the acquisition resulted in a merger that eliminated competition within a given industry.[22] This wave also saw the creation of large-scale conglomerates – companies from differing industries merging.[23] In 1929, however, the stock market crash put an abrupt end to the economically successful 1920s and the second merger wave.[24]

C. The Third Merger Wave (1965–1975)

The predominant M&A activity of the third merger wave came in the form of conglomerate transactions, allowing firms to diversify

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[18] Donald J. Smythe, *The Supreme Court and the Trusts: Antitrust and the Foundations of Modern American Business Regulation from Knight to Swift,* 39 U.C. DAVIS L. REV. 85, 95 (2005).

[19] GAUGHAN, *supra* note 5, at 48.

[20] *Id. See id.* at 165–66.

[21] *Antitrust Law – The Clayton Act – –"Engaged in Commerce" Requirement of Section 7 – United States v. American Building Maintenance Industries*, 1975 BYU L. REV. 763, 764, 771–72 (1975).

[22] *See The Antitrust Laws*, FED. TRADE COMM'N, https://www.ftc.gov/advice-guidance/competition-guidance/guide-antitrust-laws/antitrust-laws (last visited Oct. 9, 2022.

[23] Neil H. Jacoby, *The Conglomerate Corporation*, 26 FIN. ANALYSIS J. 35 (1970).

[24] *See* GAUGHAN, *supra* note 5, at 48; *see also* C. Edward Fletcher, III, *Of Crashes, Corrections, and the Culture of Financial Information – What They Tell Us About the Need for Federal Securities Regulation*, 54 MO. L. REV. , 1 (1989).

their product lines.[25] From small firms to large corporations, these businesses took advantage of the conglomerate trend and targeted companies that could expand their portfolio across multiple markets. This expansion, in part, was a response to the Celler-Kefauver Act – which closed many loopholes in the Clayton Act and restricted anticompetitive mergers that resulted in acquisitions of assets.[26] This conglomerate wave of diversification, rather than specialization, fizzled out over time following legal impediments such as the Tax Reform Act of 1969.[27] Overall, this wave illustrated a period of early successes met with subsequent failures due to poor integration models.[28] Industry giants acquired operations in unrelated areas– having no relevant expertise–and faced hardships as specialized managers were tasked with diversified enterprises.[29] Ultimately, the oil crisis of the mid 1970s created a worldwide recession and led to the conclusion of the third merger wave.[30]

D. The Fourth Merger Wave (1984–1989)

The fourth wave is characterized by the emergence of hostile mergers and megamergers.[31] The dollar value per acquisition soared in

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[25] Bureau of Economics. FED. TRADE COMM'N, *Statistical Report on Mergers and Acquisitions* 1978, at 109, 116 (1980).

[26] *See* Celler-Kefauver Act, Pub. L. No. 81—899, 64 Stat. 1125 (1950); see also Daniel A. Crane, *Fascism and Monopoly*, 118 MICH. L. REV. 1315, 1323–24 (2020).

[27] Tax Reform Act of 1969, Pub L. No. 91–172, 83 Stat. 487 (codified in the INT. REV. CODE of 1954); GAUGHAN, *supra* note 5, at 53.

[28] *See* GAUGHAN, *supra* note 5, at 54; *see also* Timothy M. Hurley, *The Urge to Merge: Contemporary Theories on the Rise of Conglomerate Mergers in the 1960s*, 1 J. BUS. & TECH. L. 185, 185–861 (2006).

[29] GAUGHAN, *supra* note 5, at 54; *see generally* John Brooks, *The Go-Go Years: The Drama and Crashing Finale of Wall Street's Bullish 60s*, 220–65 (Allworth Press 1998) (1973) (discussing the rise and fall of conglomerate mergers through diversification and focus on stock price).

[30] Katherine Ching, *What Drives Merger Waves? A Study of the Seven Historical Merger Waves in the U.S.*, SCRIPPS SENIOR THESES (2019), https://scholarship.claremont.edu/cgi/viewcontent.cgi?article=2311&context=scripps_theses; *see also* Marina Martynova & Luc Renneboog, *A Century of Corporate Takeovers: What Have We Learned and Where Do We Stand?*, JOURNAL OF BANKING AND FINANCE (2008), https://ecgi.global/sites/default/files/working_papers/documents/SSRN-id820984.pdf.

[31] Stephen D. Hogan & Marsha Cope Huie, *Bigness, Junk, and Bust-Ups: End of the Fourth Merger Wave?*, 37 ANTITRUST BULL. 881, 910–13 (1992).

this period and transformed the standard transaction size.[32] Here, the largest acquisition of the fourth wave was the $24.88 billion acquisition of RJR Nabisco by Kohlberg Kravis.[33] As mergers presented sizable profit opportunities from takeover and divestment,[34] merger specialists took advantage of perceived inefficiencies; these experts worked in tandem with legal counsel to establish products and techniques to either facilitate or prevent takeovers.[35] While potential targets implemented antitakeover defenses to protect against unwanted bids, bidders were tasked with creating methods to circumvent the defense.[36] Concurrently, Drexel Burnham Lambert spearheaded the growth of junk bonds to help finance takeovers and enabled corporate raiders and firms to attempt takeovers of large corporations.[37] Also, debt financing, specifically through a leveraged buyouts ("LBO") with a significant portion of the acquisition cost covered through debt, was popularized for taking companies private and allowed a smaller company to takeover a larger company.[38] These trends distinguished this wave and revolutionized the mechanics of M&A and how deal lawyers counseled their clients moving forward. Ultimately, the junk bond market collapsed, and the economy fell into a recession at the end of the decade – thus, ending the fourth merger wave and the first wave of high leveraged deals.[39]

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[32] *See id.* at 884–86.

[33] *See History of the RJR Nabisco Takeover*, N.Y. TIMES, Dec. 2, 1988, at D15; *see also* Thomas J. André, Jr., Book Review, 59 U. CIN. L. REV. 479, 484 (1990). (reviewing BRYAN BURROUGH & JOHN HELYAR, BARBARIANS AT THE GATE: THE FALL OF RJR NABISCO (1990))

[34] Andrei Schiefer & Robert W. Vishny, *The Takeover Wave of the 1980s*, 249 AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE 745 (1990).

[35] *See* Dale Arthur Oesterle, *Method to the Merger Madness: Revisiting the '80s Takeover Boom*, 20 REGULATION 27, 27, 30–31 (1997).

[36] GAUGHAN, *supra* note 5, at 62.

[37] Max Abelson et al., *Renegades of Junk: The Rise and Fall of the Drexel Empire*, BLOOMBERG (April 1, 2015), https://www.bloomberg.com/graphics/2015-drexel-burnham-oral-history/.

[38] Will Kenton, *Leveraged Buyout (LBOBYO) Definition: How It Works with Example*, INVESTOPEDIA (June 19, 2022), https://www.investopedia.com/terms/l/leveragedbuyout.asp.

[39] GAUGHAN, *supra* note 5, at 64; *see also* Rich Karlgaard, *The Not So Great Recession…*, FORBES (Mar. 11, 2010, 9:50 AM),

E. The Fifth Merger Wave (1992–2001)

Learning from mistakes of the fourth wave and highly leveraged deals, companies sought to strategically expand, utilizing equity financing and a long-term focus.[40] Consolidated deals, however, characterized this wave and saw the rise and fall of roll-ups.[41] Here, investors would merge multiple, small companies within the same industry into one large entity – thus, better positioned to enjoy economies of scale and an access to a national market.[42] This fad, however, predominantly benefitted dealmakers, but led to bankruptcy or eventual sale for the companies.[43]

On the other hand, this wave also produced historic megadeals in different industries that survive presently.[44] The oil and gas industry saw the merger of Exxon and Mobil – currently one of the largest oil refining companies in the world.[45] Additionally, the automotive industry saw the merger of Daimler and Chrysler and pharmaceutical companies Glaxo Wellcome and SmithKline Beecham merged to create an industry leader, GlaxoSmithKline.[46]

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https://www.forbes.com/forbes/2010/0329/opinions-rich-karlgaard-great-recession-digital-rules.html?sh=c32e62d50b78.

[40] 799-818 (2000). GAUGHAN, *supra* note 5, at 65; *see also* Bernard S. Black, *The First International Merger Wave (and the Fifth and Last U.S. Wave)*, 54 U. MIAMI L. REV. 799, 802–06 (2000).

[41] GAUGHAN, *supra* note 5, at 66.

[42] George Deeb, *How to Roll-Up Several Companies into One*, FORBES (Oct. 2, 2018, 1:39 PM), https://www.forbes.com/sites/georgedeeb/2018/10/02/how-to-roll-up-several-companies-into-one.

[43] GAUGHAN, *supra* note 5, at 66.

[44] Tim Smart, *Big Mergers Get Bigger in the '90s*, WASHINGTON. POST (Oct. 27, 1997), https://www.washingtonpost.com/archive/politics/1997/10/27/big-mergers-get-bigger-in-the-90s.

[45] *Our History*, EXXONMOBIL (July 22, 2021), https://corporate.exxonmobil.com/About-us/Who-we-are/Our-history.

[46] *1995-2007: "World Corp." Vision,* MERCEDES-BENZ GROUP, https://www.daimler.com/ company/tradition/company-history/1995-2007.html (last visited Oct. 7, 2022); *see also History and Heritage*, GSK, https://www.gsk.com/en-gb/about-us/our-history/creating-the-gsk-of-today-1950-1999/. (last visited Oct. 7, 2022)

The fifth merger wave hastily ended with the bankruptcies of WorldCom and Enron along with the Dotcom bubble burst.[47]

F. The Sixth Merger Wave (2004–2007)

Following a brief recession, the sixth merger wave possessed the following themes: globalization, a boost of the private equity space, and increased shareholder activism.[48] Companies focused on reaching global markets and establishing a multinational network.[49] Shareholders became more involved through exercising their ownership rights to ensure better corporate governance.[50] Additionally, this sixth merger wave is often called the "Golden Age" of private equity due to a boom in the sector.[51] Specifically, private equity buyers took advantage of the period's low interest rates and financed leveraged acquisitions at much lower costs.[52] Private equity firms could raise equity capital, borrow money at attractive rates, buy companies, and then profit off a sale if the market increased the value of the acquired entity.[53] Thus, M&A activity increased accordingly for this short period.

The proliferation of subprime mortgages offered to unqualified buyers led to a subprime mortgage crisis and preceded the Great Recession of 2008 – ending the sixth wave.[54]

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[47] *See* GAUGHAN, *supra* note 5, at 68; Stanford GSB Staff, *What Led to Enron, WorldCom and the Like*, STANFORD. GRADUATE SCHOOL. BUS. (Oct. 15, 2003), https://www.gsb.stanford.edu/insights/what-led-enron-worldcom.

[48] GAUGHAN, *supra* note 5, at 68–69, 280, 310, 312–14.

[49] *Id.* at 135.

[50] *See id.* at 292–97.

[51] Brian Cheffins & John Armour, *The Eclipse of Private Equity*, 33 DEL. J. CORP. L. 1, 6–7 (2008).

[52] *See* Felix Barber & Michael Goold, *The Strategic Secret of Private Equity*, HARV. BUS. (REV. (Sept. 2007),) https://hbr.org/2007/09/the-strategic-secret-of-private-equity.

[53] *Id.*; *see generally* Elisabeth de Fontenay, *Private Equity Firms as Gatekeepers*, 33 REV. BANKING & FIN. L. 115, 115, 117 (2013–2014).

[54] *See* GAUGHAN, *supra* note 5, at 69; *see also* Erin Coghlan, et al. *What Really Caused the Great Recession?,* INSTITUTE FOR RESEARCH ON LABOR & EMPLOYMENT(Sept. 19, 2018), https://irle.berkeley. Edu/what-really-caused-the-great-recession/.

II. TRADITIONAL M&A PROCESS

Today, after more than a century of completed transactions, law firms have established distinguished M&A practice groups and trained virtuoso deal lawyers. A "traditional" M&A process has cultivated, and firms employ refined approaches to executing each phase in the lifecycle of a deal – from pre-deal preparation to post-closing adjustments.[55] This tried-and-true process, however, has its pitfalls and is likely no longer the fastest, cheapest, and best overall option in an innovative, new era.[56]

A. Searching & Compiling

An M&A transaction can have a significant impact on the success or failure of a company and determine its future.[57] In recent years, the overall number of deals has declined, yet the number of "megadeals" has surged.[58] An increase in high-priced deals heightens the significance of legal due diligence and creates pressure for lawyers to provide accurate information to either execute deals at proper valuations or advise a maneuver to another target.[59] Here, counsel is brought in to explore the potential legal risks of either the target or bidder and to highlight these issues to the client.[60] Often, the due diligence process occurs simultaneously with negotiations and the

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[55] *See* Doeg, *supra* note 4; David Harding & Andrew Schwedel, *Why Traditional M&A is Becoming Less Important*, HARV. BUS. REV. (May 25, 2018), https://hbr.org/2018/05/why-traditional-ma-is-becoming-less-important.

[56] Doeg, *supra* note 4.

[57] PROTIVITI, *Guide to Mergers and Acquisitions*, PROTIVITI, https://www.protiviti.com/sites/default/files/united_states/insights/guide-to-mergers-acquisitions-faqs-protiviti.pdf.

[58] *See* Ortenca Aliaj et al., *Megadeals Lead M&A Revival as Big Companies Bulk Up*, FIN. TIMES (Aug. 9, 2020), https://www.ft.com/content; *see also* Colin Wittmer & John D. Potter, *Deals 2022 Midyear Outlook,* PWC, https://www.pwc.com/us/en/services /deals/industry-insights.html. (last visited Oct. 7, 2022).

[59] Matt Savare et al., *M&A Due Diligence: A Primer on Transactions Involving Private Sellers*, WESTLAW J. MERGERS & ACQUISITIONS (Feb. 25, 2020), https://1.next.westlaw.com/Document/I1c4b8b0f542411eaadfea82903531a62/View/FullText.html?originationContext=typeAhead&transitionType=Default&contextData=(sc.Defaul.

[60] CFI Team, *Due Diligence*, CORPORATE FINANCE INSTITUTE, (Feb. 10, 2022) https://corporatefinanceinstitute .com/resources/knowledge/deals/due-diligence-overview/.

information discovered can prove useful in creating contractual provisions.[61]

On the buy side, due diligence typically consists of a review of the following items: the target company's assets and liabilities, potential legal liabilities, operations of the target company, third party consents or anti-takeover devices, and confirming the information a target company includes in its disclosure schedules.[62] With disclosure schedules, the bidder can identify any questionable issues the target has listed.[63] Here, the bidder can then perform diligence on these topics, seek additional disclosures, or negotiate to exclude the troubled assets from the transaction.[64] Accordingly, this information should guide the lawyer in her valuation of the target company and identification of requisite ancillary documents.[65] In valuation, if the diligence process uncovers significant liabilities or obstacles, the bidder may adjust its valuation of the target and renegotiate the merger consideration.[66] For example, if the target company is involved in any pending litigation, the acquiror can estimate the potential amount of liability exposure and seek to reduce the acquisition price by a like amount.[67] Additionally, the disclosure requirements of the Securities

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[61] Savare, *supra* note 59.

[62] Richard D. Harroch et al., *A Comprehensive Guide to Due Diligence Issues in Mergers and Acquisitions*, FORBES (Mar. 27, 2019, 1:11 PM), https://www.forbes.com/sites/allbusiness/2019/03/27/comprehensive-guide-due-diligence-issues-mergers-and-acquisitions.

[63] *See* Richard D. Harroch, *The Importance of Disclosure Schedules in Mergers and Acquisitions*, FORBES (Aug. 7, 2016, 10:10 AM), https://www.forbes.com/sites/allbusiness/2016/08/07/the-importance-of-disclosure-schedules-in-mergers-and-acquisitions.

[64] Bruce Gribens et al., *M&A Due Diligence Workshop*, DELOITTE 8 (2017), https://www2.deloitte.com/content/dam/Deloitte/us/Documents/Real%20Estate/us-engineering-construction-ma-due-diligence.pdf.

[65] *See id.*

[66] *Mergers and Acquisitions: The Ultimate Guide*, AVANT ADVISORY GRP., https://www.avantadvisory.com/mergers-and-acquisitions-the-ultimate-guide/ (last visited Oct. 9, 2022); *see also* Brian Boufarah & Bob Lamm, *M&A: The Intersection of Due Diligence and Governance*, DELOITTE, https://www2.deloitte.com/us/en/pages/center-for-board-effectiveness/articles/mergers-and-acquisitions-due-diligence-and-governance.html

[67] *Id.* Candice Choh & Carlos Soto, Gibson, Dunn & Crutcher LLP, *Common Topics of Review in M&A Due Diligence*, LEXISNEXIS (Aug. 23, 2021), https://www.lexisnexis.com/supp/LargeLaw/no-index/coronavirus/mergers-acquisitions/corporate-and-ma-

and Exchange Commission allow free, public access to information on potential target companies through its Electronic Data Gathering Analysis and Retrieval system ("EDGAR"); however, this is a relatively crude, not-well-curated government database.[68] Alternatively, curated access to these same filings can be had through third party data providers such as Lexis, Westlaw, and Bloomberg.

On the sell side, the target may conduct reverse due diligence if the buyer intends to issue stock as the merger consideration or it is a merger of equals.[69] Where the buyer will issue stock to the target's stockholders as consideration for the merger, the target's counsel will likely investigate any obstacles to the issuance or closing, research economic risks of receiving the buyer's stock, and confirm the value of the buyer's stock.[70] In a merger of equals, both sides' diligence will consist of reviewing each other's business, creating an integration outlook, identifying obstacles to closing, and confirming the value of the transaction.[71]

At the onset, the buy side employs its due diligence process of managing preliminary obligations, creating a diligence team, sending diligence requests, and organizing the requested materials.[72] Junior

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common-topics-of-review-in-ma-due-diligence.pdf (including litigation in descriptions of due diligence considerations by topic area); *see Mergers and Acquisitions: The Ultimate Guide*, *supra* note 66.

[68] *See generally EDGAR—Search and Access*, U.S. SEC. & EXCH. COMM'N, https://www.sec.gov/edgar/search-and-access (Aug. 23, 2022) (providing a variety of information accessible to the public).

[69] Richard D. Harroch & David A. Lipkin, *20 Key Due Diligence Activities in a Merger and Acquisition Transaction*, FORBES (Dec. 19, 2014, 1:09 PM), https://www.forbes.com/sites/allbusiness/2014/12/19/20-key-due-diligence-activities-in-a-merger-and-acquisition-transaction/.

[70] *See id.*

[71] *See id.*

[72] Practical Law Corporate & Securities, *Due Diligence for Public Mergers and Acquisitions*, PRACTICAL LAW, HTTPS://1.NEXT.WESTLAW.COM/DOCUMENT/I0FA00BB7EF0811E28578F7CCC38DCBEE/VIEW/FULLTEXT.HTML?NAVIGATIONPATH=SEARCH%2FV1%2FRESULTS%2FNAVIGATION%2FI0AD6AD3B00000183BE858E7CC9203CB5%3FPPCID%3D45E6BA2C987C4864B46884E203681FEA%26NAV%3DKNOWHOW%26FRAGMENTIDENTIFIER%3DI0FA00BB7EF0811E28578F7CCC38DCBEE%26PARENTRANK%3D0%26STARTINDEX%3D1%26CONTEXTDATA%3D%2528SC.SEARCH%2529%26TRANSITIONTYPE%3DSEARCHITEM&LISTSOURCE=SEARCH&LISTPAGESOURCE=F6A3F541D4E1CD798C5A5F07E08E8281&LIST=KNOWHOW&RANK=1&SESSIONSCOPEID=58387BA8559B69DDEF7D54E1DDA838FE50E386CD7938576711FFE8D70645F633&PPCI

associates typically create a binder of important public documents and information regarding the target.[73] This broad compilation of information allows senior partners to review documents, such as: annual reports, stockholder agreements, press releases, proxy statements organizational documents, and share price information.[74] Counsel will then meet with the client to discuss the scope of the due diligence review, potential deal breakers, and the budget for the investigation.[75] Defining this scope allows counsel to create a compatible diligence team.[76] Specifically, counsel can determine whether members such as accountants, specialists, or outside consultants are needed.[77]

Next, the diligence team will typically review virtual data rooms – an online location established by the seller (and investment bank) which acts as a warehouse of key documents relevant to target's business.[78] Here, deal lawyers will work through large sets of documents to filter pertinent information and identify any omissions.[79]

D=45E6BA2C987C4864B46884E203681FEA&ORIGINATIONCONTEXT=SEARCH%20RESULT&TRANSITIONTYPE=SEARCHITEM&CONTEXTDATA=%28SC.SEARCH%29 (last visited Oct. 9, 2022) (providing "key guidance on organizing, implementing, and conducting a comprehensive due diligence review").

[73] *Id.*

[74] *Id.*

[75] *Id.*

[76] *Id.*

[77] *Id.*

[78] Richard D. Harroch, *The Importance of Online Data Rooms in Mergers and Acquisitions*, FORBES (Aug. 15, 2016, 10:14 AM), https://www.forbes.com/sites/allbusiness/2016/08/15/the-importance-of-online-data-rooms-in-mergers-and-acquisitions/? sh=b83ed0e35667.

[79] Ashley Melidosian et al., *Using a Virtual Data Room for an M&A Transaction*, THOMSON REUTERS PRACTICAL LAW, https://1.next.westlaw.com. *See generally* PRACTICAL LAW, HTTPS://1.NEXT.WESTLAW.COM/DOCUMENT/I192CC63E8EC011EA80AFECE799150095/VIEW/FULLTEXT.HTML?NAVIGATIONPATH=SEARCH%2FV1%2FRESULTS%2FNAVIGATION%2FI0AD6AD3B00000183BE8221D0C9203B6E%3FPPCID%3D9FE084F00D9E4596842E7B5B45444860%26NAV%3DKNOWHOW%26FRAGMENTIDENTIFIER%3DI192CC63E8EC011EA80AFECE799150095%26PARENTRANK%3D0%26STARTINDEX%3D1%26CONTEXTDATA%3D%2528SC.SEARCH%2529%26TRANSITIONTYPE%3DSEARCHITEM&LISTSOURCE=SEARCH&LISTPAGESOURCE=52DD2429347C7374121A6236D2F71C73&LIST=KNOWHOW&RANK=1&SESSIONSCOPEID=58387BA8559B69DDEF7D54E1DDA838FE50E386CD7938576711FFE8D70645F633&PPCID=9FE084F00D9E4596842E7B5B45444860&ORIGINATIONCONTEXT=SEARCH%20RESUL

Additionally, lawyers will perform diligence calls and communicate with the target's counsel to supplement necessary documents into the data rooms.[80] Concurrently, if the diligence team requires non-public information (confidential or inaccessible) then a due diligence request will likely be submitted.[81] Many firms utilize standardized diligence request lists for the respective transaction yet may tailor their request list to specific needs.[82] As the diligence team searches through all this data and starts to gain more customized information, they start compiling summaries.[83] These summaries keep record of the findings on a weekly basis and may be communicated with the client for specific queries.[84] At the conclusion of the due diligence review, the team will produce a due diligence memorandum that addresses important findings, red flags material risks, and acknowledges areas that were not investigated.[85]

As detailed, this searching and compiling process takes a significant amount of time and effort at the expense of the diligence team.[86] In traditional M&A, sifting through thousands of documents and depending on communication with the opposite counsel can extend the diligence process significantly.[87] Also, the enormous effort focused on organizing the information and compiling reports does not always guarantee success down the road.[88] For example, the time spent

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T&TRANSITIONTYPE=SEARCHITEM&CONTEXTDATA=(SC.SEARCH)&NAVID=0D6CE38C0490464D4A536FB93CDF9B55(last visited Oct. 9, 2022) (providing an overview of considerations in administering a virtual data room during the due diligence process)

[80] *See* Practical Law Corporate & Securities, *supra* note 72.

[81] *Id.*

[82] *See* Frank Fletcher & Keith E. Gottfried, *Due Diligence & Your M&A Success Story*, ACC DOCKET, Sept. 2011, at 34, 42, 46.

[83] *Id. See* Practical Law Corporate & Securities, *supra* note 72.

[84] *See id.*

[85] *See id.*; *see also* Robert B. Robbins, PILLSBURY WINTHROP SHAW PITTMAN LLP, *Due Diligence in Private Placement Offerings* 23 AMERICAN (2015), https://www.pillsburylaw.com/images/content/1/0/v2/1059/DueDiligenceinPrivatePlacementOfferings1.pdf (describing red flags and providing examples); *see supra* note 57 at 3.

[86] *Mistakes That Kill M&A Deals*, MERGER RES., https://merger-resources.com/mistakes-that-kill-ma-deals/ (last visited Sept. 18, 2022).

[87] *See* Cassity Ming, *The Due Diligence Process for M&A: A Complete Guide*, SECUREDOCS (May 20, 2016), https://www.securedocs.com/blog/the-due-diligence-process-for-ma-a-complete-guide.

[88] *Id.*

creating orderly binders eliminates time that can be spent on "analyzing the information, identifying opportunities and risks, and developing strategies to achieve business objectives."[89]

B. Failure to Define Business Objectives & Outline Integration Strategy

Research shows that approximately 10% of large mergers and acquisitions transactions do not reach closing each year.[90] Clear business objectives are vital throughout the lifecycle of the deal. These goals set the standard for the team working to close and what success looks like post-closing.[91] The legal team must reflect on their client's business and identify prominent weaknesses.[92] With this information, counsel can identify non-negotiables in an ideal target.[93] Major priorities of a target may consist of customers, revenues, human talent, or acquisition of a patent.[94] Additionally, counsel should analyze the current market to determine whether a transaction will garner a more competitive position for the merged company.[95]

To attain all this information, however, requires lawyers to work even longer hours and read thousands of documents.[96] Closing the deal on time starts to outweigh other smaller facets of the transaction and often distracts lawyers from enumerating clear business goals.[97] There is arguably not enough time to simultaneously complete the due diligence process and investigate nuances of the market.[98] Without a

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89 Doeg, *supra* note 4.

90 Dariush Bahreini et. al., *Done Deal? Why Many Large Transactions Fail to Cross the Finish Line*, MCKINSEY & CO. (Aug. 5, 2019), https://www.mckinsey.com/business-functions/strategy-and-corporate-finance/our-insights/done-deal-why-many-large-transactions-fail-to-cross-the-finish-line#.

91 *See* Doeg, *supra* note 4.

92 Mitchell Lee Marks et al., *Surviving M&A*, HARV. BUS. REV., Mar.–Apr. 2017, at 147.

93 Dr. Ajit Kambil, *CFO Insights: Target Screening and Evaluation: One Size Does Not Fit All*, DELOITTE (2010), https://deloitte.wsj.com/cfo/files/2012/06/DFPORH2011120500001.pdf.

94 *Id.*

95 Benjamin Gomes-Casseres, *How Mergers Change the Way Your Company Competes*, HARV. BUS. REV. (June 12, 2018), https://hbr.org/2018/06/how-mergers-change-the-way-your-company-competes.

96 Doeg, *supra* note 4, at 1.

97 Doeg, *supra* note 4, at 1.

98 Doeg, *supra* note 4, at 2.

focused list detailing the pathway to success, deal lawyers often focus on non-critical information.[99]

Further, outlining a plan for the post-integration success of a transaction is difficult when confined to information from due diligence reviews and communications between parties.[100] Searching through public filings and reports on a target's operations does not yield key insight into what a post-closing future entails.[101] Deal lawyers often comb through documents with a primary focus on risk, losing an opportunity to use diligence as an information acquisition vehicle that can enhance the combined entity's future operations.[102]

Utilizing a more forward-looking approach, the diligence team can explore potential synergies and their attainability.[103] Predicting synergy is integral to the success of a business post-closing.[104] The Daimler-Chrysler merger illustrates what can go wrong when integration plans are not fleshed out prior to negotiations.[105] In that merger, the failure to research the cultural and communicative differences between the German and American companies caused serious issues.[106] Successful cross-cultural mergers such as Vodafone and Mannesmann, however, highlight that integration is achievable with a thorough, proactive integration plan.[107] A thorough integration plan can: (i) explore optimization of the target's business activities—i.e., analyze the possibility of negotiation with customers or suppliers to quickly

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99 Doeg, *supra* note 4, at 1.

100 Kevin Dabrowski, *Post-Merger Integration – Plan and Challenges*, PGS SOFTWARE (Sept. 9, 2022), https://www.pgs-soft.com/blog/post-merger-integration-plan-and-challenges/.

101 Robert A. Profusek & Lyle G. Ganske, *It's Time to Rethink the Lawyer's Role in Dealmaking*, JONES DAY (OCT. 2007), https://www.jonesday.com/en/insights/2007/10/its-time-to-rethink-the-lawyers-role-in-dealmaking.

102 *Id.*

103 Kristin Ficery et al., *Where Has All the Synergy Gone? The M&A Puzzle*, 28 J. BUS. STRATEGY 29, 35 (2007).

104 *Id.*

105 Michael Gates, *Cross-Cultural Issues Relating to the DaimlerChrysler Merge – Case Study*, CROSSCULTURE (Apr. 27, 2016), https://www.crossculture.com/cross-cultural-issues-at-the-daimlerchrysler-merge-case-study.

106 *Id.*

107 Gautam Naik & Anita Raghavan, *Vodafone, Mannesman Set Takeover at $180.95 Billion After Long Struggle*, WALL ST. J. (Feb. 4, 2000), https://www.wsj.com/articles/SB949581016407171705.

achieve cost savings or revenue improvements; (ii) identify other potential value creation opportunities between the merged companies to ensure value is created not destroyed; and (iii) analyze the market to predict how customers will respond to a change in ownership.[108]

C. Excessive And Uncertain Costs

With a primary focus on closing the deal, attention is seldom allocated to wasteful expenses.[109] These costs accumulate and can represent up to 10% of the total transaction cost.[110] For example, due diligence often uncovers challenges with the target company.[111] These costs are unpredictable and add expenses throughout the process.[112] Absent from the traditional M&A process is a method to assess how prior deals varied from budget and proven markers of waste.[113] This missing data capture prevents deal teams from developing practices to monitor waste and facilitating plans to improve outcomes in the future.[114] Further, with no real-time tracking, lawyers cannot effectively communicate with their clients to make timely decisions on a changing budget.[115] Here, this inefficient process serves as a vehicle for increased costs—expensive lawyers working more hours with deficient technological capabilities to acquire and analyze cost saving information.[116]

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[108] BAKER & MCKENZIE, POST-ACQUISITION INTEGRATION HANDBOOK 9–25 (2017), https://www.bakermckenzie.com/-/media/files/insight/publications/2017/05/bk_global_postacquisitionhandbook_2017.pdf.

[109] Edward Stephen, *Save the Deal: Most Wasteful Costs During M&A*, FIRMEX, Aug. 2014, at 2.

[110] *Id.*

[111] *See* Robert G. Eccles et al., *Are you Paying Too Much for That Acquisition*?, HARV. BUS. REV., July–Aug. 1999, at 141 (mentioning calculating synergy costs and necessary information which is obtained through due diligence).

[112] Stephen, *supra* note 109, at 2.

[113] *Id.*

[114] *Id.*

[115] Marsha Lewis, *How to Improve M&A Deal Tracking and Make it Efficient*, DEALROOM (Aug. 4, 2022), https://dealroom.net/blog/5-effective-ways-to-improve-deal-tracking.

[116] Brittany Boessel, *Does AI Really Cut Costs?*, KIRA (May 27, 2020), https://kirasystems.com/learn/does-ai-really-cut-costs/.

III. THE LEAN METHODOLOGY

Since the worldwide economic crisis of 2008, companies have aimed to create value through reinventing their operations.[117] Generally, these efforts involve discovering and reemphasizing modern management methods to rewire manufacturing, logistics, and company culture.[118] Specifically, a few of the current, popular management methods are Theory of Constraints, Six Sigma, TQM, and Lean Management.[119] This Section will focus on Lean Management and its origins in the Japanese multinational automotive manufacturer, Toyota.[120] Additionally, this Section will discuss the transferable skills of "lean management" and their applicability to the future of M&A activity.

A. The Toyota Production System

The Toyota Production System[121] ("TPS") evolved from Toyoda Spinning and Weaving company and its founder Sakichi Toyoda. In 1902, Sakichi created a motor-driven loom that detected when a thread broke and immediately halted production.[122] This specialized mechanism prevented the manufacturing of defective material and later led to an automatic loom that enabled a single worker to simultaneously operate multiple machines.[123] Sakichi sold the rights to the automatic loom and used the profits to start an automotive division of his company under his son, Kiichiro Toyoda.[124] In 1937, Kiichiro started the Toyota Motor Company ("Toyota") and created a revolutionary production system—coined "Just-in-Time."[125] Resulting from the "[inability] to waste money on excess equipment or materials in production" and to compete with

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117 Lukasz Dekier, *The Origins and Evolution of Lean Management System*, 5 J. INT'L STUD. 46–51 (2012).
118 *Id.*
119 Dave Nave, *How to Compare Six Sigma, Lean, and the Theory of Constraints*, 35 QUALITY PROGRESS 73, 73-78 (2002).
120 Dekier, *supra* note 117.
121 ART OF LEAN, INC., TOYOTA PRODUCTION SYSTEM BASIC HANDBOOK 3 (2000), http://artoflean.com/wp-content/uploads/2019/01/Basic_TPS_Handbook.pdf.
122 *Id.* at 3.
123 *Id.*
124 *Id.*
125 Dekier, *supra* note 117.

European and American markets, Toyota created Just-in-Time to manufacture high-quality automobiles with a fast and flexible process.[126]

Over time, Toyota made advancements to its vehicle production system and based its continual improvements—"kaizen"[127]—on two concepts: "Just-in-Time" and "Jidoka."[128] Further, TPS is "based on the philosophy of achieving the complete elimination of all waste in pursuit of the most efficient methods.[129]

i. *Just-in-Time*

Arguably the most famous pillar of TPS, the Just-in-Time system "aims to produce and deliver the right parts, in the right amount, at the right time using minimum necessary resources."[130] Additionally, producing quality products through the "complete elimination of waste, inconsistencies, and unreasonable requirements," is a process known in Japanese as "muda, mura, muri."[131] Reducing inventory, thus, exposes problems in real time. Less inventory allows workers to identify any issues disrupting the flow of production so they can then address them immediately through the "Kanban" system.[132] Kanban is a signal and response system that "conveys a set of instructions to either withdraw parts or produce a given product."[133] The system has visual cues that pass through the production line and alert employees of what materials to replenish.[134] Further, this process limits a buildup of excess inventory and refills inventory Just-in-Time. Kanban,

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126 *See* TOYOTA PRODUCTION SYSTEMS HANDBOOK, *supra* note 121, at 3.
127 Toyota Motor Corp., *Company Information, Vision & Philosophy*, https://global.toyota/en/company/vision-and-philosophy/production-system/ (last visited Sept. 15, 2022).
128 *Id.*
129 *Id.*
130 *See* TOYOTA PRODUCTION SYSTEMS HANDBOOK, *supra* note 121, at 6.
131 *See id.*; *The Toyota 3M Model: Muda, Mura, Muri*, MUDAMASTERS (Aug. 12, 2013), https://www.mudamasters.com/en/lean-production-theory/toyota-3m-model-muda-mura-muri.
132 *See generally* Clay Halton, *Kanban*, INVESTOPEDIA, (May 4, 2021), https://www.investopedia.com/terms/k/kanban.asp
133 *What is Kanban System & Kanban Board?*, AGILE PROJECT MGMT., (January 3, 2016), https://medium.com/agile-project-management-scrum-lean-kanban/what-is-kanban-system-kanban-board-scrum-vs-kanban-8a08673b0e55.
134 *See id.*

therefore, facilitates Just-in-Time and orchestrates the moving parts on the production floor; specifically, providing visual cues for managers to monitor where parts are needed, and which inventory needs refilling. Thus, Kanban allows for full communication throughout the entirety of the process and works to eliminating unwanted waste.[135] Another key element of Just-in-Time is the "pull system."[136] The pull system limits production to only the parts needed downstream and eliminates under or over production.[137] The pull system and Kanban work simultaneously and allow material to flow through manufacturing – as needed.[138]

ii. Jidoka

Building on the efficiency of Just-in-Time, Toyota created a second pillar – "Jidoka."[139] Jidoka, or loosely "automation with a human touch" in Japanese, is comprised of two parts: 1) building the quality into the process and 2) enabling separation of man from machine in work environments.[140] The first component reapplies the motive of Toyota's loom and aims to employ intelligent technology that automatically shuts down at the first sign of an abnormality.[141] This halt prevents the defect from traveling downstream and injuring employees, damaging machines, or generating waste.[142] Secondly, Jidoka separates the man from machine by removing humans from the equation.[143] If the technology is trained to stop independently, then Jidoka allows employees to spend their time elsewhere, add value at other stages of production.[144]

Through kaizen, TPS continues to adapt and evolve to increase efficiency and eliminate waste. Toyota maintains this system to prevent seven sources of muda (waste):

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135 *See* Toyota Motor Corp., *supra* note 127.
136 Toyota Blog, *How Does Just-in-Time Production Work?*, TOYOTA UK MAG. (May 31, 2013), https://mag.toyota.co.uk/just-in-time/.
137 *See generally id.*
138 *Id.*
139 Toyota Motor Corp., *supra*, note 127.
140 *See id.*
141 Toyota Motor Corp., *supra*, note 127.
142 *Id.*
143 *See generally id.*
144 *See generally id.*; Marley S. Weiss, *Innovations in Collective Bargaining: Nummi – Driven to Excellence*, 13 HOFSTRA LAB. L.J. 433,468 (1996).

i. Waste of overproduction
ii. Waste of time on hand
iii. Waste of transportation
iv. Waste of over processing
v. Waste of excess inventory
vi. Waste of movement
vii. Waste of manufacturing defective products[145]

iii. Lean Manufacturing

It was not until years later, however, that the lean process reached a worldwide audience, with scholars beginning to study the successes of Toyota's production system and the impact of reducing waste on the manufacturing process.[146] In 1990, James P. Womack, Daniel T. Jones, and Daniel Roos authored *The Machine That Changed the World* – a book based on the Massachusetts Institute of Technology's ("MIT") $5 million, five-year study on the future of the automobile.[147] Here, the authors coined the term "lean manufacturing," and revealed the components that made TPS an enduring success.[148] Specifically, the book defined the lean system and detailed its advantages over the mass production model used by American and European car manufactures.[149] The authors argued that the lean system is applicable to every value-creating activity.[150]

Approximately thirty years later, lean manufacturing has become central to the operations of companies around the world.[151] Additional literature has expanded on the Toyota model and heralds it as the predecessor to modern, lean manufacturing. Womack founded the Lean

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145 Nawras Skhmot, *The 8 Wastes of Lean*, THE LEAN WAY (Aug. 5, 2017), https://theleanway.net/The-8-Wastes-of-Lean.

146 *See generally Lean Manufacturing Made Toyota the Success Story It Is Today*, ROBERT C. BYRD INSTITUTE AT MARSHALL UNIVERSITY, https://www.rcbi.org/updates/lean-manufacturing-made-toyota-the-success-story-it-is-today/ (last visited Sept. 29, 2022).

147 JAMES P. WOMACK, DANIEL T. JONES & DANIEL ROOS, THE MACHINE THAT CHANGED THE WORLD: THE STORY OF LEAN PRODUCTION – TOYOTA'S SECRET WEAPON IN THE GLOBAL CAR WARS THAT IS REVOLUTIONIZING WORLD INDUSTRY (2007).

148 *See supra* note 147.

149 *See supra* note 147.

150 *Id.*

151 *Top 10 Lean Manufacturing Companies in the World*, UFUTURE (Feb. 1, 2018), https://ufuture.com/top-10-lean-manufacturing-companies-world/.

Enterprise Institute ("LEI"), a nonprofit with a mission to "make things better through lean thinking and practice" and identified *The Five Steps of Lean Implementation*[152]:

> **Step 1: Specify Value**
>
> Define value from the perspective of the final customer. Express value in terms of a specific product, which meets the customer's needs at a specific price and at a specific time.
>
> **Step 2: Map**
>
> Identify the value stream, the set of all specific actions required to bring a specific product through the three critical management tasks of any business: the problem-solving task, the information management task, and the physical transformation task. Create a map of the Current State and the Future State of the value stream. Identify and categorize waste in the Current State and eliminate it.
>
> **Step 3: Flow**
>
> Make the remaining steps in the value stream flow. Eliminate functional barriers and develop a product-focused organization that dramatically improves lead-time.
>
> **Step 4: Pull**
>
> Let the customer pull products as needed, eliminating the need for a sales forecast.[153]
>
> **Step 5: Perfection**
>
> There is no end to the process of reducing effort, time, space, cost, and mistakes. Return to the first step and begin the next lean transformation, offering a product which is ever more nearly what the customer wants.

Womack's steps illustrate the core ideas that have developed over time and enumerate these thoughts into an action plan for companies. Here, the lean manufacturing system requires identifying value, mapping the

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[152] *See generally The Five Steps of Lean Implementation*, LEAN ENTER. INST., (May 18, 2000), https://www.lean.org/the-lean-post/articles/the-five-steps-of-lean-implementation/.
[153] *Id.*

value stream, creating flow, establishing pull, and seeking perfection.[154] The value stream is the collection of these actions.[155]

First, value is defined by the customer's needs for a specific product.[156] The key information at this stage is the timeline for manufacturing and delivery, the price point, and specific expectations or requirements the customer may demand.[157]

Second, after the value is defined, the next action is to map all the steps and processes involved in creating a product – from raw material to deliverable.[158] Value stream mapping ("VSM") – "a visual way of representing the flow of information and materials in the production of products" – allows management to monitor product flow, waste, and the relationship between information and material flow. [159] Specifically, VSM identifies waste in the *current state map* and exposes any areas requiring improvements.[160] Managers then take this information and create a *future state map*, outlining the ideal design of the process with the achievable solutions.[161] As this lean cycle is repeated, waste areas are identified each time and, thus, contribute to an evolving, efficient flow.[162] The visual nature of these maps allow managers to pinpoint the exact spot in the process where a lean tool bolsters the flow of the product value stream.[163]

Third, after waste is removed from the value stream, the next action is to ensure the remaining steps of the flow operate without any defects

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154 *Id.*

155 *What Is Value Stream Mapping (VSM)?*, ASQ, https://asq.org/quality-resources/lean/value-stream-mapping (last visited Oct. 2, 2022).

156 Mark Crawford, *5 Lean Principles Every Engineer Should Know*, ASME (Mar. 9, 2016), https://www.asme.org/topics-resources/content/5-lean-principles-every-should-know.

157 *Id.*

158 *Id.*

159 Jason F. Brown et al., *Lean Manufacturing Principles and Their Application*, THOMSON REUTERS PRACTICAL LAW (May–June 2008), https://1.next.westlaw.com/Document/I56d58afff3a511eabea4f0dc9fb69570/View/FullText.html?originationContext=typeAhead&transitionType=Default&contextData=(sc.Default)

160 Todd Hessing, *Value Stream Mapping*, SIX SIGMA STUDY GUIDE, https://sixsigmastudyguide.com/value-stream-mapping/ (last visited Sept. 29, 2022).

161 *Id.*

162 *Id.*

163 *Id.*; *see also Value Stream Mapping to Eliminate Waste in the Supply Chain*, INDUS. STAR (Nov. 16, 2017), https://industrystar.medium.com/value-stream-mapping-to-eliminate-waste-in-the-supply-chain-8075254c0164.

or bottlenecks.[164] Guaranteeing flow of the entire process may cause managers to separate from their individual department and make a cross-functional effort.[165] This departure from silo thinking often produce difficulties early on but leads to significant returns in yield and productivity for the process.[166]

Fourth, the pull stage builds on improved flow and reduces the time to market of the product.[167] Specifically, products are created Just-in-Time and the customer can "pull" the deliverable as needed.[168] Here, the waste of stockpiled inventory is eliminated, and the company receives the benefits of value stream mapping – e.g., adding lean tools throughout and across the process to deliver products efficiently, and as needed.[169] The pull stage, thus, evidences the significant costs the company can save and the ability to satisfy the needs of customers.[170]

Lastly, the most important step follows the achievement of the prior four steps – pursuing perfection.[171] Here, this principle embodies the foundation of the lean process to chase improvement of operations and create solutions accordingly.[172] Implementers are tasked with striving towards perfection while bringing the greatest value to the customer.[173] This relentless pursuit allows the company to constantly analyze the production flow to increase value and eliminate areas of waste.[174] The goal

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164 *See* Crawford, *supra* note 156.
165 *See* Crawford, *supra* note 156.
166 *See id.*
167 *The Core 5 Principles for Lean Implementation*, KANBANIZE, https://kanbanize.com/lean-management/implementing-lean (last visited Sept. 28, 2022).
168 *Id.*
169 *Id.*
170 *See generally id.*; *see also* Tony Manos, *Value Stream Mapping–an Introduction*, 39 QUALITY PROGRESS 64, 64–69 (June 2006).
171 *See generally* Ross & Associates Environmental Consulting, Ltd., *Pursuing Perfection: Case Studies Examining Lean Manufacturing Strategies, Pollution Prevention, and Environmental Regulatory Management Implications*, U.S. ENVIRONMENTAL PROTECTION AGENCY (Aug. 20, 2022), https://www.epa.gov/sites/production/files/2013-11/documents/perfection.pdf.
172 *See* Rachaelle Lynn, *Lean Management Principles*, PLANVIEW, https://www.planview.com/resources/articles/lean-management-principles/.
173 *See generally What Is Lean? Continuous Improvement*, MICH. TECH OFF. CONTINUOUS IMPROVEMENT, https://www.mtu.edu/improvement/learn/what/ (last visited Sept. 29, 2022).
174 *See generally id.*

is not to reach the unattainable perfect process, but to maintain the pursuit of it through continuous improvement.[175]

Overall, this methodology provides manufacturing companies with a systematic, visual approach to reinventing what is possible for their production. Managers are encouraged to map out the entire process and let it run to detect inefficient areas. Identifying these areas then promotes the implementation of new technologies in the specific department and on a cross-functional basis. This efficiency provides for Just-in-Time delivery to customers and, therefore, a recovery of lost production hours, an elimination of defects in flow, and an evolved production line. If executed correctly, lean manufacturing repeats continually and allows the company to better serve the client as a byproduct of pursuing perfection.

iv. Lean Process

In recent years, companies outside of manufacturing have converted their knowledge of lean manufacturing into their respective businesses.[176] On one hand, the transferable principles of the lean manufacturing process allow implementation absent a factory or tangible parts. Applying this to a hypothetical, e.g., a fictional software company named "WidgetTech," the lean process starts at the same step – specifying value. WidgetTech must identify customers and the dollar amount they are willing to pay for the software. WidgetTech will then create a visual aid of their production of software (e.g., human hours, integrated development environments, etc.) and distinguish areas of waste and inefficiency. Next, WidgetTech can address this issue with a proposed solution and let the remainder of software development unfold. Here, WidgetTech can notice any elements of waste in other parts of the development process and correct these defects. Further, the company can augment the software to cater to specific demands of a customer; therefore, establishing a pull system. WidgetTech provides an example of lean's applicability to a virtual production flow and the company's-maintained capacity to pursue perfection.

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[175] *See generally* Lynn Patrick Ingram, *Getting "Lean" for the Twenty-First Century*, 98 MICH. B.J. 50, 50 (2019).

[176] MICHAEL BALLÉ ET AL., THE LEAN STRATEGY: USING LEAN TO CREATE COMPETITIVE ADVANTAGE, UNLEASH INNOVATION, AND DELIVER SUSTAINABLE GROWTH (2018).

On the other hand, organizational and management structures can benefit from lean principles absent any product at all. Over the years, what started as a "set of ideas for building better cars now drives better work in general – and better results – in everything from the world's largest companies to a new generation of start-ups and in every sector from healthcare to IT to financial services to nonprofits."[177] Here, McKinsey and Company is referring to the lean management system – a continuous-improvement system centered on people and focused on culture, engagement, and productivity.[178] The lean management system is rooted in four integrated disciplines: (1) delivering value efficiently to the customer, (2) enabling people to lead and contribute to their fullest potential, (3) discovering better ways of working, and (4) connecting strategy, goals, and meaningful purpose.[179]

First, lean management focuses on serving customers well and satisfying their demands as needed.[180] The ability to fulfill this customer service discipline rests in the infrastructure of the organization.[181] Specifically, finding out the exact needs of the customer absent the buying/selling of a product requires a customer feedback loop and internal programs to correct defects in service.[182] For example, email surveys provide customers the opportunity to discuss their satisfaction or lack thereof with the company's service.[183] This data can then assist management in detecting and addressing issues in the organization's flow.[184] Equally as important is information gathering on who the customers are to give the exact level of support needed – no less, and no more.[185] Second, lean management depends on the professional and

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[177] Zachary Surak, *The Work of Leaders in a Lean Management Enterprise*, MCKINSEY & CO. (July 31, 2017), https://www.mckinsey.com/capabilities/operations/our-insights/the-continuous-improvement-leader-engaging-people-for-a-digital-age.
[178] *Id.*
[179] *See* Surak, *supra* note 177.
[180] Michal Demecko & Jaroslava Kadarova, *New Approaches in Lean Management*, 39 PROCEDIA ECON. & FIN. 11 (2016) (detailing the benefits of lean management for healthcare patients).
[181] *See* MICH. TECH OFF. CONTINUOUS IMPROVEMENT, *supra* note 173.
[182] *See id.*
[183] *See also* Alessandro Martemucci, *Lean Marketing & the Voice of the Customer*, PLANET LEAN (Mar. 15, 2021), https://planet-lean.com/lean-marketing-customer-value/.
[184] *See* MICH. TECH OFF. CONTINUOUS IMPROVEMENT, *supra* note 158.
[185] *See id.*

personal development of the individuals that comprise the organization.[186] Third, lean management encourages organizations to adapt constantly.[187] An effective continuous-improvement culture creates an environment where employees feel comfortable to speak openly as issues arise and work collectively to design a solution.[188] Lastly, lean management seeks to connect the objectives the organization wants to achieve with the individual objectives of its employees.[189] Together, this "integrated approach transforms the entire organization from the front line to the executive suite, allowing it to renew itself continuously for lasting value."[190]

v. Leaning Away from Traditional M&A

Acknowledging the progression of the lean process, the question arises of whether this efficient method can influence traditional mergers and acquisitions the same way it revolutionized the automobile industry. As discussed, the traditional approach is inundated with pitfalls that create an inefficient, outdated system. Specifically, an extensive due diligence process, failure to define business objectives or outline strategy, and extensive and uncertain costs.

A quick summary of lean's progression is needed to analyze its potential impact on traditional M&A. Foundationally, the Toyota Production System created a process of continuous improvement (kaizen)

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[186] See *id.*; *see also* Asim Rais Siddiqui, *Lean Philosophy: The Way of Business That Gave Rise to Industry Giants,* FORBES (Jan. 14, 2021) (suggested parenthetical), https://www.forbes.com/sites/theyec/2021/01/14/lean-philosophy-the-way-of-business-that-gave-rise-to-industry-giants/.

[187] *See generally The Work of Leaders in a Lean Management Enterprise*, MCKINSEY & CO. (Aug. 2017), https://www.mckinsey.com/~/media/McKinsey/Business%20Functions/Operations/Our%20Insights/The%20work%20of%20leaders%20in%20a%20lean%20management%20enterprise/The-work-of-leaders-in-a-lean-management-enterprise.ashx.

[188] *See generally* Arvand Chandrasekaran et al., *Creating a Culture of Continuous Improvement*, HARV. BUS. REV. (May 24, 2019), https://hbr.org/2019/05/creating-a-culture-of-continuous-improvement.

[189] *See* MICH. TECH OFF. CONTINUOUS IMPROVEMENT, *supra* note 173.

[190] *The Lean Management Enterprise*, MCKINSEY & CO. (Mar. 1, 2014), https://www.mckinsey.com/~/media/mckinsey/industries/consumer%20packaged%20goods/our%20insights/the%20consumer%20sector%20in%202030%20trends%20and%20questions%20to%20consider/2014_lean_management_enterprise_compendium.pdf.

that focuses on the pillars of Just-in-Time and Jidoka. Just-in-Time uses a visual aid system (Kanban) to eliminate waste, inconsistencies, and unreasonable requirements (muda, mura, muri) by producing and delivering the exact amount of parts at the exact time needed. Further, Jidoka aims to build the quality into the process and separate human from machine. Inserting intelligent technology to the production line corrects defects in its flow and, thus, moves individuals from unnecessary positions to others where they can add increased value. Throughout these pillars, sources of waste (muda) are identified as: overproduction, extended time, transportation, over processing, excess inventory, movement, and manufacturing defective products.

Next, the MIT scientist's study on the future of the automobile industry led to The Five Steps of Lean Implementation. These five steps enumerated a process that is applicable to any industry and incorporates the principles of lean manufacturing. Step one requires a definition of the customer's value for the product – i.e., what they will pay for it. Step two requires a value stream map that illustrates the production cycle. Here, management can monitor which positions along the flow are inefficient and can create a future state map, implementing a solution to any defect, that outlines a more efficient process. Step three requires a cross-functional approach of monitoring downstream production and identifying any problems. Step four requires the execution of the prior steps, which creates a pull system where customers can buy products on an as needed basis. Finally, Step five requires the constant pursuit of perfection. This strive for perfection create a self-regulating process that focuses on continued improvement and adding value to the customer.

Recently, companies have transferred this methodology to processes sans manufacturing and into management structures. With the rise of ecommerce, companies that sell digital products (not produced in factories) can apply the principles of lean manufacturing to their flow. This application is detailed in the WidgetTech example, where software development is continuously improved and catered to the customer. On the other hand, the lean management system presents an approach for companies to improve the flow of their organizational structure. Specifically, through the disciplines of delivering value, enabling employees to reach their full potential, creating better ways of working, and connecting strategy, goals, and meaningful purpose.

For a moment, let us pretend the lifecycle of a traditional buy-side deal looks like the design and production of a new model for the fictional Lean

Motor Company ("Lean Motors"). First, the deal team must develop an acquisition strategy – defining goals of the acquisition, current market conditions, financing, and future projections. For Lean Motors, this step requires strategizing what is possible in the creation of a new model and the logistics requisite from inception to completion. Next, the deal team will outline its search criteria for an acquisition and what an ideal company will provide to improve the buyer's position. Lean Motors will sketch an ideal design of the model car and its features that make it an asset to the company and its customers. The deal team will then take this criterion, search for ideal companies, and evaluate the potential target companies. Art meets reality in Lean Motor's next step, as they apply packaging considerations (engine availability, safety requirements, etc.) to the sketch and re-draw the model to comply with engineering demands. Next, the buy-side will contact the potential target, through a letter of intent ("LOI"), expressing interest and providing a summary of the proposed deal. For Lean Motors, the comparable step is transferring the updated sketch to a computer rendering and forming an eventual full, clay model. Next, the target company will provide the deal team with important information about its financials. This critical information will allow the buy-side to perform a valuation of the target. Lean Motors will, similarly, perform a valuation of the expenses of the materials that will turn this clay model into a functioning vehicle. Based on the valuation, the buy-side will negotiate and sign a deal with the target. After the expenses are calculated, Lean Motors will create a working model with the chosen materials and subject the prototype to testing. Here, arguably the most important stage occurs for the buy-side, as they must enter the due diligence stage and investigate pertinent documents of the target to ensure its financial standing and operations. Similarly, Lean Motors enters its most important stage of gaining management and Board of Director approval of its concept model. On approval, the automotive company may begin creating a strategy for mass production of the car. The buy-sides next phase includes drafting final purchase and sale contracts and, after signing, closing the deal. As the deal is now closed, the buy-side must finalize its financial strategy to ensure the deal goes through. For both Lean Motors and the deal team, the steps following will both consist of executing their respective production strategies and integration of their products – e.g.,

the integration of two companies into one and the introduction of the car into the customer base.

Without implementing an efficient process, however, an acquisition strategy may never reach closing, or a sketch may never develop into Lean Motor's new car. Yet if lawyers do not know what went wrong, then how will they know what to resolve? This question highlights an opening for the lean process to continuously improve the space of traditional mergers and acquisitions. From a management to flow of production perspective, lean can advance M&A and add value to clients. A deal team can walk through an old deal and apply the Five Steps. Specifically, they can create a current state map and determine whether value was ever identified or understood for their client and if their inefficient process caused the client to pay excess amounts. Also, asking whether waste occurred along the process and either delayed the deal, proved adversarial between both parties, and caused it to never reach the integration phase. Additionally, deciding whether time periods in the flow of the deal were wasted on focusing on non-critical things. Here, through gained experience, the team can look at waste points in the flow and create solutions that can resolve the deal defects moving forward. Jidoka will arise and exploit areas where an implemented solution can release a lawyer downstream to add value somewhere else. This mapping will also expose the need for new innovative technology to separate the lawyer from the process and provide expedition. Alternatively, creating and implementing a visual aid system can allow the team to signal when a pause is needed and a conversation with the client is needed to clarify aspects of the deal. The benefit of creating this map, therefore, is the ability to look backwards at what did not work to move forward and use these solutions on the next deal. In the next deal, the team can audition these solutions and let the deal run its course. After reflecting on this deal, the lawyers can identify the success or failure of flow and determine whether other parts of the deal process provided impediments. Applying solutions to the flow will result in a pull system where clients can express their needs and have these conditions reflected in the timely acquisition or sale of a company. Repeating this reflection after prior deals and applying adjustments to upcoming deals executes the pursuit of perfection. If these steps are carried out, the process will also reveal the underlying characteristics of the firm. Specifically, whether the firm is trying to achieve as many deals as possible – regardless of satisfying objectives – or if it is promulgating a culture and

expectation that lawyers will add value to clients in every step from pre-negotiation to post-closing.

Equally important, the management structure of the M&A group plays a significant role in adding value to clients. Through a lean management system, kaizen relies on personal relationships and the interconnectedness of the organization. A deal team can strive towards delivering value to its customers if it establishes a constructive feedback loop. During or after a deal, lawyers can give clients the opportunity to communicate on why or why not their expectations are satisfied. This data can play a significant role in either altering the strategy for the remainder of the deal or gaining insight into the success or failure of a prior transaction. In turn, this feedback allows lawyers to fully understand the values of the client and have a better chance of delivering on these requirements – no less, and no more. Further, teams often consist of lawyers ranging from associates to senior partners. The firm, through lean management, has an opportunity to create an environment where everyone has a platform to raise issues with confidence and contribute to group solutions. Concurrently, a firm has the platform to create opportunities for personal and professional development – e.g., giving leadership roles to younger associates. Taken together, open communication and further training allows for synergy within teams and more dynamic lawyers on a deal. Through investing in employees, value is added throughout the lifecycle of a deal on an individual and collective level. Thus, creating a growing environment of individuals that contribute to the success of the deal regardless of position in the firm. This environment results in a continuous improvement culture where communication is encouraged and discovering more efficient ways of working is a result. Finally, outlining the objectives of the deal team and the individual lawyer is beneficial. For example, developing business objectives is advantageous for the success of the deal and, also, addressing the goals of an individual lawyer provides a developmental opportunity. If these personal, professional goals are shared with a more senior lawyer, a mentorship can form and attribute to the execution of connecting strategy and goals with a meaningful purpose.

In sum, applying the lean process enables deal teams to address the pitfalls of traditional M&A through its influence on the production flow and management infrastructure. Mapping the failures of past deals allows for opportunities to better serve clients with faster, better, cheaper

solutions. Additionally, the success of lean process depends on generating a continuous improvement culture rooted in communication and collaboration.

In the past few years, however, major developments in technology have occurred that will likely change mergers and acquisitions forever. The emergence of artificial intelligence ("AI") creates a platform for Jidoka to expand what is possible in the lifecycle of a deal, enables the analysis of thousands of documents in minutes, and all the while adds value to the customer – thus bringing the lean method to life.

IV. ARTIFICIAL INTELLIGENCE AND THE FUTURE OF M&A

A. Defining Artificial Intelligence

People often associate artificial intelligence ("AI") with the robots, flying cars, and science fiction that take over the world in Hollywood films. These depictions, however, fail to capture the essence of AI and its capabilities in our everyday lives. AI is transforming the world around us by revolutionizing everything from commerce and healthcare to transportation and cybersecurity.[191] Thus, it is important to understand its definition and why it matters.[192]

Artificial intelligence, in computer science, refers to any human-like intelligence exhibited by a computer, robot, or other machine.[193] In a broader sense, artificial intelligence refers to the ability of a computer or machine to mimic the capabilities of the human mind – learning from examples and experience, recognizing objects, understanding and responding to language, making decisions, and solving problems.[194] AI, therefore, represents a significant realm of computing technology.[195]

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[191] *See Artificial Intelligence*, NAT'L INST. STANDARDS & TECH., https://www.nist.gov/artificial-intelligence (last visited Sept. 25, 2022).

[192] *See generally* Gideon Lewis-Kraus, *The Great A.I. Awakening*, N.Y. TIMES MAG. (Dec. 14, 2016), https://www.nytimes.com/2016/12/14/magazine/the-great-ai-awakening.html.

[193] *See* IBM Cloud Education, *Artificial Intelligence (AI)*, IBM (June 3, 2020), https://www.ibm.com/cloud/learn/what-is-artificial-intelligence.

[194] *See id.*

[195] *See generally* NILS J. NELSON, THE QUEST FOR ARTIFICIAL INTELLIGENCE: A HISTORY OF IDEAS AND ACHIEVEMENT 623 (2009), https://ai.stanford.edu/~nilsson/QAI/qai.pdf.

Notably, two other terms are often used and misused within AI and require an understanding – machine learning and deep learning.[196] Machine learning is a subset of an AI program that increases in accuracy as it digests more data; specifically, using algorithms to facilitate tasks and enabling operators to train it through providing more data over time.[197] This type of learning automates analytical model building and aims to find hidden insights in data without explicitly programming machines on where to look or what to conclude.[198] Machine learning models rely on a neural network–a network of algorithmic calculations that attempt to mimic the perception and thought process of the human brain.[199] This type of machine learning consists of interconnected units that process information in response to external inputs.[200] Specifically, this network is comprised of 1) an input level where data is introduced, 2) a hidden level where algorithms process inputs and apply parameters, and 3) an output layer where conclusions are produced based on the overall process.[201] Throughout this process, the model relies on labeled data to identify and classify objects and information.[202] In sum, through machine learning, algorithms' performances are improved as they are exposed to more data over time.[203]

Deep learning utilizes a deep neural network of multiple hidden layers to perform classification tasks directly from images, text, or sound.[204]

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196 *See* IBM Cloud Education, *Deep Learning*, IBM (May 1, 2020), https://www.ibm.com/cloud/learn/deep-learning.

197 *See id.*

198 *See Artificial Intelligence – What It Is and Why It Matters*, SAS INST., https://www.sas.com/en_us/insights/analytics/what-is-artificial-intelligence.html (last visited Sept. 25, 2022).

199 *See* IBM Cloud Education, *supra* note 196.

200 *See id.*

201 Gavril Ognjanovski, *Everything You Need to Know About Neural Networks and Backpropagation – Machine Learning Easy and Fun*, TOWARDS DATA SCI. (Jan. 14, 2019), https://towardsdatascience.com/everything-you-need-to-know-about-neural-networks-and-backpropagation-machine-learning-made-easy-e5285bc2be3a.

202 *See generally* IBM Cloud Education, *supra* note 196.

203 *See* Artem Oppermann, *Artificial Intelligence vs. Machine Learning vs. Deep Learning*, BUILT IN (September 16, 2022), https://builtin.com/artificial-intelligence/ai-vs-machine-learning

204 *See What Is Deep Learning: 3 Things You Need to Know*, MATHWORKS, https://www.mathworks.com/discovery/deep-learning.html (last visited Sept. 25, 2022).

These models are trained by a multi-layer neural network and large sets of labeled data.[205] Unlike machine learning, whose neural networks carry 2-3 hidden layers, deep learning models can have up to 150 layers.[206] Within each layer, deep learning algorithms perform calculations and make predictions repeatedly, progressively "learning" and gradually improving the accuracy of the outcome over time.[207] Specifically, there are input layers where the model absorbs data and output layers where the model produces an identification, classification, or description calculation; together, these are known as the visible layers.[208] In between are hidden layers, where a process known as forward propagation occurs–the model weighs the calculations of the previous layer and refines it with more complex algorithms.[209] Additionally, there is backpropagation which is "the process of adjusting the weights by looking at the difference between prediction and the actual result."[210] Here, backpropagation identifies and assigns weights to errors in previous layers and then pushes them back to previous layers to train or refine the model.[211] Collectively, forward propagation and backpropagation use inconsistencies in previous outcomes to create an efficient system that improves with further exposure to significant amounts of data.[212] Altogether, deep learning's ability to learn from unstructured, unlabeled data and continuously increase the accuracy of complex tasks, without human intervention, is what differentiates it as a more advanced machine learning.[213]

Further, AI generally falls into two broad categories – Artificial Narrow Intelligence and Artificial General Intelligence.[214]

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205 *See id.*
206 *Id.*
207 *See* IBM Cloud Education, *supra* note 196.
208 *See id.*
209 *See Hidden Layer*, DEEP AI, https://deepai.org/machine-learning-glossary-and-terms/hidden-layer-machine-learning (last visited Sept. 25, 2022).
210 Rishi Sidhu, *Layman's Introduction to Backpropagation*, TOWARDS DATA SCI. (June 13, 2019), https://towardsdatascience.com/laymans-introduction-to-backpropagation-efa2c64437db.
211 *See* IBM Cloud Education, *supra* note 196.
212 *See* Ahmed Gad, *A Comprehensive Guide to the Backpropagation Algorithm in Neural Networks*, NEPTUNEBLOG (Mar. 27, 2021), https://neptune.ai/blog/backpropagation-algorithm-in-neural-networks-guide.
213 *See* IBM Cloud Education, *supra* note 196.
214 *See* IBM Cloud Education, *supra* note 193.

Artificial Narrow Intelligence, also known as Narrow AI or Weak AI, "is AI that is trained and focused to perform specific tasks."[215] Specifically, this technology operates within a limited context that emphasizes on performing a few functions exceptionally well. Its focus on narrow tasks simulates human cognition and automates time-consuming tasks by analyzing data in ways that humans sometimes cannot.[216] Additionally, Narrow AI helps users transfer big data into disposable information with pattern detection and the capability to make predictions.[217] Its weakness, however, originates from its inability to operate outside its specific parameters. Examples of Narrow AI are Amazon's Alexa, Apple's Siri, and self-driving cars.[218]

Artificial General Intelligence, also known as Strong AI, is the theoretical next level of artificial intelligence where a machine's intelligence is indistinguishable from the human mind.[219] Strong AI replicates the autonomy of the human brain–including the ability to learn, understand, and plan any intellectual task, and problem solve based on reasoning.[220] A Strong AI-enabled machine, hypothetically, is interchangeable with a human in a highly skilled work environment and has full human cognition.[221] To get to this point, the Strong AI machine would have to learn like a child, through input and experiences with a progression of capabilities over time.[222] As a result, this machine has

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[215] IBM Cloud Education, *supra* note 193; *see* Amal Joby, *Narrow AI: Not as Weak as It Sounds*, G2 LEARNING HUB (Dec. 16, 2020), https://www.g2.com/articles/narrow-ai.
[216] Jake Frankenfield, *Weak AI*, INVESTOPEDIA (Jan. 1, 2022), https://www.investopedia.com/terms/w/weak-ai.asp.
[217] *Id.*
[218] Ben Dickson, *What Is Artificial Intelligence (Narrow AI)?*, TECHTALKS (Apr. 9, 2020), https://bdtechtalks.com/2020/04/09/what-is-narrow-artificial-intelligence-ani/.
[219] *Id.*; Jeff Kerns, *What's the Difference Between Weak and Strong AI?*, MACHINEDESIGN (Feb. 15, 2017), https://www.machinedesign.com/markets/robotics/article/21835139/whats-the-difference-between-weak-and-strong-ai; *see also Strong AI*, INVESTOPEDIA, https://www.investopedia.com/terms/s/strong-ai.asp.
[220] Sara Brown, *Machine Learning, Explained*, MIT SLOAN SCHOOL OF MANAGEMENT (April 21, 2021), https://mitsloan.mit.edu/ideas-made-to-matter/machine-learning-explained.
[221] *A Holistic Approach to AI*, OPEN COMPUTING FACILITY AT UC BERKELEY, https://www.ocf.berkeley.edu/~arihuang/academic/research/strongai3.html.
[222] *Id.*

consciousness, can learn and reason through high level tasks, and communicate its thoughts with others and unlike Narrow AI, Strong AI can perform a variety of functions simultaneously with a human-like consciousness and without limited parameters.[223] Moving forward, experts vary in their predictions of when this theoretical concept will develop. Some experts believe it will occur by 2045 while others predict it will require a century.[224]

This 30,000-foot view provides insight into the capabilities of AI and its fundamental structure yet raises the question of how this rapidly evolving technology will impact the world and, specifically, mergers and acquisitions. The next section will start with an overarching review of the benefits of artificial intelligence and narrow into its impact on the lifecycle of an M&A deal.

B. Benefits of AI

Generally, AI provides significant benefits to the industries or products when applied. First and foremost, AI adds intelligence to existing systems. Employing AI capabilities to existing products allows utilization of substantial amounts of data to improve the overall efficiency and competencies of a service. For example, Siri, the voice-controlled and AI-powered personal assistant, transitioned Apple products into its new generation.[225] Apple's incorporation of deep learning across its footprint enables users to make phone calls, look up information, send messages, make reservations, and send payments hands-free just by saying, "Hey Siri."[226] Further, AI aids in reducing human error. Humans are prone to make mistakes often resulting from cognitive overload including stress and fatigue.[227] Cognitive overload is removed from the equation with

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[223] *Id.*; *see generally* Anna Fosberg, *From Siri to Sci-Fi: Are Lethal Robots People Too?*, 124 PENN ST. L. REV. 501, 506–07 (2020).

[224] *10 Ways AI Will Change the World by 2050*, THINKML (June 7, 2021), https://thinkml.ai/10-ways-ai-will-change-the-world-by-2050/#:~:text=By%202050%2C%20AI%20will%20reach,meticulous%20manner%2C%20hence%20increasing%20efficiency.

[225] *See* James Allworth, *Apple's Siri Is As Revolutionary As the Mac*, HARV. BUS. REV. (Oct. 13, 2011), https://hbr.org/2011/10/apples-siri-is-as-revolutionar.

[226] Siri Team, *Hey Siri: An On-Device DNN-Powered Voice Trigger for Apple's Personal Assistant*, APPLE MACH. LEARNING RSCH. (Oct. 2017), https://machinelearning.apple.com/research/hey-siri.

[227] *Why Brain Overload Happens*, LESLEY UNIV., https://lesley.edu/article/why-brain-overload-happens (last visited Sept. 29, 2022).

machines capable of working around the clock, nonstop. Like Jidoka, AI separates the man from the machine using algorithms from previously extracted data, allowing it to grow increasingly accurate with exposure. Additionally, this separation enables AI systems to execute tasks in dangerous climates where humans could never safely operate. For example, Autonomous Underwater Vehicles ("AUVs") are AI-driven robots, "preprogrammed to collect data from particular parts of the deep ocean," and have produced groundbreaking research from the Arctic Ocean.[228] Altogether, AI likely offers a cheaper, better, and faster solution to whatever system it is applied to through its ability to maximize extracted data, automate repetitive tasks, and regenerate a more efficient process.

C. Benefits of AI In M&A

Lawyers in the United States are required to abide by the American Bar Association Model Code of Professional Responsibility, a set of model rules and commentaries established to serve as legal, professional, and ethical standards for lawyers.[229] Under Rule 1.1, concerning a lawyer's competent representation of a client, is the following comment:

> To maintain the requisite knowledge and skill, a lawyer should keep abreast of changes in the law and its practice, including the benefits and risks associated with relevant technology, engage in continuing study and education and comply with all continuing legal education requirements to which the lawyer is subject.[230]

This rule tasks lawyers with committing to lifelong learning in the interest of best serving clients. Specifically, staying au courant with innovative technology and its application to legal services helps lawyers maintain a requisite level of knowledge and skill. This level of competency presents law firms with the challenge of balancing a pursuit of efficient, quality, legal services with an equally important pursuit of reducing costs. A solution to this juggling act is the implementation of artificial intelligence

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[228] Smithsonian Ocean Team, *From Submarines to Robots: Exploring the Deep Ocean*, SMITHSONIAN OCEAN (Dec. 2009), https://ocean.si.edu/ecosystems/deep-sea/submarines-robots-exploring-deep-ocean.

[229] MODEL RULES OF PRO. CONDUCT (AM. BAR ASS'N 2020).

[230] MODEL RULES OF PRO. CONDUCT r. 1.1 cmt. 8 (AM. BAR. ASS'N, 2020).

systems. By using AI, law firms can uphold their duty to the ABA model rules, keep abreast with relevant technology, and benefit their own practice by cutting costs. Broadly speaking, AI allows firms to execute legal tasks with large data sets in a fraction of the time. This data-driven approach produces more accurate results and progressively transforms the approach of the firm from purely reactive to more predictive. Further, it separates the man from the machine and eliminates hours of meticulous work spent searching through thousands of documents. Thus, removing attorneys from tedious tasks can place them in value-add positions downstream.

In the last decade, the average time to finalize a merger or acquisition has risen by more than 30%.[231] This increase in time capital is attributed to increasing complexity in the deal-making environment, and "growing scrutiny from governments, regulators, and investors."[232] Apart from closing a deal and reaching full synergistic potential, the initial stages of contract review and due diligence are the most important timeframe of a deal's lifecycle. Additionally, these are the stages where the traditional pitfalls of M&A thrive, including time-consumption, failure to define objectives, and human error.[233] Implementing AI in these initial stages permits deal teams to review, analyze, and organize contracts to inform business strategy, identify opportunities, and minimize risk.[234] AI software can inspect thousands of documents and search for crucial provisions such as exclusivity, noncompete agreements, most favored nation clauses, uncapped liabilities, and indemnity clauses.[235] Absent innovative technology, lawyers must manually review each document to examine which contracts may need to be renegotiated or terminated. The following section explores each step of the lifecycle of a modern M&A deal and inspect how and when AI systems can add value.

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231 Justin Lavelle, *Gartner Says the Average Time to Close an M&A Deal Has Risen More Than 30 Percent in the Last Decade*, GARTNER (Oct. 15, 2019), https://www.gartner.com/en/newsroom/press-releases/2018-10-15-gartner-says-the-average-time-to-close-an-manda-deal-has-risen-more-than-30-percent-in-the-last-decade.

232 *Id.*

233 NOAH WAISBERG & ALEXANDER HUDEK, AI FOR LAWYERS (2021).

234 *Id.*

235 *Id.*

i. *Pre-Closing – Diligence*

In the traditional diligence process, considerable resources and time are expended as lawyers search through thousands of documents for material information. Contracts serve a fundamental role in a company and give insight into its "business relationships with customers, suppliers, investors, regulators, and employees." (Footnote needed, quote from same book as FN 218 on ANF list). Most companies, however, do not have an adequate database to keep track of the information in their contracts or a means of extracting data from these documents.[236] Ranging from small to large companies, the number of contracts could constitute anywhere from tens to millions–all with potential importance and relevance to an acquiror. Knowledge, therefore, is power for any acquiror inspecting its acquiree, specifically, whether the acquisition is unfavorable due to existing red flags. Inability to efficiently run through these documents commonly leads to a material contract review where deal teams spend allocated time only on the most important documents. This practice, however, fails to expose acquirors to most risks that hide in the stack of papers. Simultaneously, systematic and random errors occur where: 1) lawyers do not know exactly what they are looking for; and 2) the time-consuming nature of the work produces human mistakes.

AI software, like Kira Systems ("Kira"), provide a solution to the downfalls of the traditional approach. For example, Kira's default settings constitute 1,100 different data points for contract review.[237] The user then may customize whichever data points it needs to run its search or can alert Kira of data points unique to the deal.[238] Following the tailoring of the search, the user simply uploads its files and the software begins due diligence.[239] Here, instead of focusing on magic words, Kira searches for concepts. Kira can recognize provisions that resemble a change of control clause yet do not include any identifying words.[240] After minutes, Kira can then produce high-level summaries of its findings. Based on user preference, these summaries come in the form of summary charts,

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[236] *See How AI Streamlines and Improves Contract Review*, EPIQ (Apr. 17, 2020), https://www.jdsupra.com/legalnews/how-ai-streamlines-and-improves-22400/.
[237] WAISBERG & HUDEK, *supra* note 233.
[238] *Id.*
[239] Interview by Stefan Kostas with Noah Waisberg, CEO, Kira Systems (Apr. 1, 2021).
[240] *Id.*

descriptive reports, disclosure schedules, and organized lists of verbatim clauses. This result gives lawyers the advantage of reviewing contracts in 20-90% less time and the opportunity to find provisions that may significantly alter their position in a deal.[241] AI-powered contract reviews also "help lawyers stay compliant with applicable laws or deadlines."[242] Extracted data can reveal clauses that do not adhere to new law, allowing lawyers to remove these provisions.[243] Additionally, the software can organize deadlines associated with contracts to satisfy renewal dates or avoid future legal disputes.[244] Further, deal teams can look to historic deals and compile the data points that are attributed to the success or failure of a deal. Continually updating these data points allows the software to enlist forward propagation and backpropagation to grow accustomed to the firm's preferences and, thus, refine its process.

Additionally, deal teams can use AI to foster their capability of reaching an accurate valuation for a target company. Different AI-driven systems can extract multiples from comparable companies in the market, e.g., enterprise value/EBITDA multiples, and apply this data to the target company's financial performance, triangulating to calculate a company's valuation.[245] AI can also use specific data points to create an individualized valuation adjustment formula reflecting a subset of the firm's particular criteria.[246] Outside the precedent transaction and comparable public equities methods of valuation, AI software can gather requisite information for a discounted cash flow analysis.[247] Future free cash flows of the target are projected outwards, typically five years, using industry averages and company-specific growth rates, and then a terminal exit value

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241 WAISBERG & HUDEK, *supra* note 233.
242 *Id.*
243 *Id.*
244 *See generally id.*
245 *See* Jon Steele, *Maximizing EBITDA with AI: Focus on the Outcome*, FIN. EXECS. INT'L, (Feb. 14, 2018), https://daily.financialexecutives.org/FEI-Daily/February-2018/Maximizing-EBITDA-with-A-I-Focus-on-the-Outcome.aspx.
246 *See* WAISBERG & HUDEK, *supra* note 233, at 68.
247 *See generally IB Pitchbook – Precedent Transaction Analysis*, CORPORATE FINANCE INSTITUTE, (Feb. 8, 2022) https://corporatefinanceinstitute.com/resources/templates/presentations/pitchbook-precedent-transactions-analysis/.

is calculated using previously discussed EBITDA multiples.[248] The free cash flows and terminal values are then discounted back to present value using a WACC that the AI software deems reasonable based on current market dynamics and company-specific risk factors.[249]

Equidam, for example, provides user-friendly software to value startups.[250] Here, the user answers multiple choice questions to "capture elements such as team experience, market competition, and barriers to entry."[251] Next, the user inserts financial projections for the following three years to capture the value of future cash flows. Equidam then uses the following five methods to produce a detailed valuation of the startup: 1) checklist method, 2) scorecard method, 3) discounted cash flow (with long-term growth) method, 4) discounted cash flow (with multiple) methods, and 5) venture capital method.[252] For the Checklist method, Equidam focuses on the intangible assets of early-stage companies and "assumes a fixed maximum valuation based on the region and assigns the company a score for each of the [following] five criteria: quality of the core team, quality of the idea, product roll-out and IP protection, strategic relationships, and operating stage."[253] The Checklist method then takes the weighted sum of the score of each criterion to determine a pre-money valuation.[254] The Scorecard method first calculates a score for the company based on: the strength of the team, size of the opportunity, competitive environment, strength & protection of product/service, strategic relationships with partners, and funding required.[255] Equidam then applies these factors to comparable, recent transactions of similar companies in the region and utilizes the overall score to adjust upward or

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248 Gaurav Chakravorty, *Using Fintech and A.I. to Optimize Valuation*, LINKEDIN (Nov. 2, 2017), https://www.linkedin.com/pulse/realizing-potential-fintech-artificial-intelligence-chakravorty/.

249 *Id.*

250 *See generally* EQUIDAM, https://www.equidam.com/how-it-works (last visited Sept. 19, 2022).

251 *Understanding Equidam Valuation*, EQUIDAM, https://www.equidam.com/resources/Equidam-Valuation-Methodology.pdf (last visited Sept. 19, 2022).

252 *See Understanding Equidam Valuation, supra* note 251.

253 *Id.*

254 *Id.*

255 *Id.*

downward in valuation.[256] The company uses the standard, traditional models for both discounted cash flow methods.[257] Lastly, the Venture Capital Method "estimates the exit value of the company at the end of the forecast horizon and ignores the intermediate cash flows."[258] This method calculates the exit value by taking the EBITDA of the last projected year, applying the EBITDA multiple, and then discounting the value to the present value.[259] After this process runs completely, a twenty-one-page report is compiled and sent to the user, which can serve as a deliverable in the diligence or negotiation stages of a startup acquisition.[260]

Moving forward, deal teams can utilize their knowledge of AI systems to formulate an adequate idea of what "success" looks like at the outset of the deal. Experience with the efficient diligence process from prior transactions assists lawyers in customizing a deal process that both maximizes objectives and focuses on the data points that made the difference in the past. This process can continue to grow and adapt just as the software does, continuing to add value to the deal team and its clients.

D. Negotiation

Next, deal teams can use this information to facilitate discussions with the other side. The shortened timeline of diligence allows deal teams to act fast and modify their positioning, as needed. For example, a buy-side can highlight provisions in the documents where the seller has significant obligations to another company, supplier, or lender. The magnitude of these liabilities can shift the valuation of the purchase price and allow the buy-side to renegotiate the terms of the proposed agreement. Programs, like LegalSifter, provide the user with the ability to export both contracts and accompanying advice into a Word document, where the user can edit the document to reflect any changes.[261] This feature can prove useful to a deal team as they can propose their changes at a meeting with opposing counsel. This transferability of data allows the deal team to provide the

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256 *Id.*

257 *Id.*

258 *Id.*

259 *Id.*; *see generally* Adam Hayes, *EBITDA – Earnings Before Interest, Taxes, Depreciation, and Amortization,* INVESTOPEDIA (April 3, 2022), https://www.investopedia.com/terms/e/ebitda.asp.

260 *See Understanding Equidam Valuation, supra* note 257.

261 *See generally* LEGAL SIFTER, https://www.legalsifter.com/legalsifter-product (last visited Sep. 19, 2022).

other side with copies of their edited documents, incorporating the AI system's rationale. Additionally, this resource can help the buyer's law firm in creating a merger agreement and aid in the back-and-forth negotiations ensuing.

E. Post-Closing – Integration

Integration is critical to achieving the post-merger success that lawyers work towards throughout a deal's lifecycle.[262] Specifically, it is the "process of bringing two or more companies together with the aim of maximizing synergies to ensure that the deal lives up to its predicted value."[263] Synergy is the concept that the combined value and performance of two entities are worth more than the sum of the separate parts – i.e., two plus two equals five.[264] Generally, synergy falls into two types – cost saving and revenue enhancements.[265] Cost-saving synergy results when the increased efficiencies of the combined company eliminate redundant operating costs.[266] Streamlining processes across the two entities and communicating best practices enhances this synergy. Examples include supply chain efficiencies, improved sales and marketing, solely paying the salary of one CEO, and access to each other's intellectual property.[267] On the other hand, revenue enhancements are realized from the financial synergy between the entities following the combination. For example, the combined company may now have access to new patents, a broader market of customers, or the ability to cross-sell complementary products. Here, the merged entity can generate revenues that far exceed its sole capabilities.[268]

Executing these synergies, however, requires using key insights to create a thorough integration plan. This execution is where AI adds value

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[262] *See* Ficery et al., *supra* note 103, at 2.
[263] *The Ultimate Guide to Post Merger (M&A) Integration Process*, DEALROOM (Sept. 25, 2022), https://dealroom.net/faq/post-merger-and-acquisition-m-a-integration-process.
[264] *See* Ficery et al., *supra* note 103, at 2.
[265] CFI Team, *Types of Synergies*, CORP. FIN. INST. (Oct. 28, 2021), https://corporatefinanceinstitute.com/resources/knowledge/valuation/types-of-synergies/.
[266] *Id.*
[267] CFI Team, *supra* note 265; *see generally* LUCILA CAMPOS & DIEGO VAZQUEZ-BRUST, LEAN AND GREEN SYNERGIES IN SUPPLY CHAIN MANAGEMENT (2016).
[268] *See* CFI Team, *supra* note 265.

to the equation. MergerWare, for example, is an AI software that enables users to build a post-close road map throughout the lifecycle.[269] Through its integration manager, users can monitor post-merger key takeaways including a comparison of business targets using forecasts and realized benefits.[270] Additionally, the AI-driven program produces visuals and graphics on critical value drivers and financial synergies following the merger. Another program, Dealroom, touts a due diligence completion rate of 40% faster and consolidates all data onto one platform; thus, creating an environment where members can communicate and collaborate with data visibility.[271] Dealroom also offers expert-developed integration templates from past deals that allow teams to streamline post-close workflows.[272] In sum, these examples highlight the opportunities firms have to ensure post-merger success. Here, the combination of high-level analysis from extracted data and the lawyer's institutional knowledge can contribute to a success checklist. This checklist can stay on file throughout the lifecycle and detail every step needed to integrate the two entities in the best way possible. Starting with the hiring process, the checklist can cover short-term and long-term needs for employees and their respective benefits and compensation. Dealing with overlap or redundancies, the checklist can determine which executives will remain in management positions, whether mass layoffs are required, and what the organizational structure will look like moving forward. With employee performance, the checklist can focus on a company's employee training plans, how their human resources department operates, and what internal policies exist. Further, the checklist can ensure that the deal team assesses the technology available to merge the operating systems of both entities and forge a path forward. Most importantly, the checklist can emphasize obtaining information on the culture of the other company.[273] "Some 95 percent of executives describe cultural fit to the success of integration; [yet] 25 percent cite a lack of cultural cohesion and alignment as the

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269 *See* MERGERWARE, https://www.mergerware.com/solution/post-merger-integration-pmi/ (last visited Sept. 28, 2022).
270 *Id.*
271 *See generally* DEALROOM, www.dealroom.net (last visited Sept. 28, 2022).
272 *Id.*
273 Oliver Enger et al., *Organizational Culture in Mergers: Addressing the Unseen Forces*, MCKINSEY & CO. (Mar. 26, 2019), https://www.mckinsey.com/business-functions/organization/our-insights/organizational-culture-in-mergers-addressing-the-unseen-forces.

primary reason integration efforts fail."[274] McKinsey sets forth three key steps to understanding and managing culture during a merger: diagnose how the work gets done, set priorities, and hard-wire and support change.[275] Firms can outline this process in their checklist and make good efforts throughout the lifecycle to ensure that cultural factors and organizational alignment is accentuated and researched.

F. Moving Forward with AI

AI-driven software helps law firms recategorize the deal process as an asset rather than an expense. AI systems' deep learning method, which continue to develop through the inflow of experience and data, can be implemented in M&A endeavors. M&A deal teams can mirror this process to "capture and incorporate institutional knowledge over time."[276] M&A lawyers will grow accustomed to the key insights and data points that separate successful deals from failed deals. With this knowledge, lawyers can apply these lessons from countless transactions to their AI software which is evolving and growing right alongside the lawyers.

The COVID-19 pandemic pushed global M&A activity to record lows in early 2020 as the world faced unprecedented circumstances. After falling 25% in the second quarter, M&A activity increased 90% in the following two quarters – closing the year with a 3% decline in volume from 2019.[277] M&A deal terms, however, were forced to evolve in response to the pandemic as every day presented uncertainty on economies and businesses with the spread of the virus. Most pending deals that were either signed before or in the early moments of the pandemic either settled in court, were abandoned, or significantly restructured. In new agreements, material adverse effects, representations and warranties,

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[274] *See* Oliver Enger et al., *supra* note 273.

[275] *Id.*

[276] Doeg, *supra* note 4.

[277] Panagiotis Bayz et al., *M&A in 2020 and Trends for 2021*, MORRISON & FOERSTER LLP (Jan. 15, 2021), https://www.jdsupra.com/legalnews/m-a-in-2020-and-trends-for-2021-7116897/#_ftn1; *see also Global Mergers & Acquisitions Review – Full Year 2020 | Financial Advisors*, REFINITIV, https://thesource.lseg.com/thesource/getfile/index/41c601c5-db24-469e-bfc4-197c5482c79d?utm_source=Eloqua&utm_medium=email&utm_campaign=00014FG_NewsletterDQRFinancialAdvisory_Other&utm_content=NL_M&A%20Financial%20Advisory%20Review_4Q20.

regulatory approvals, and structures of consideration were scrutinized and heavily negotiated. "Sellers sought flexibility to take potentially dramatic steps with respect to their businesses, while buyers continued to want to limit the changes a target could make and still require a buyer to close."[278] Further, buyers wanted more reps and warranties and related disclosures, while sellers wanted to exclude consideration of the effects of the pandemic within the material adverse effect clauses. Additionally, these unprecedented deals frequently incorporated earnouts, holdbacks, or other devices to implement assurances for uncertain future performance. Consequently, the pandemic expanded the due diligence process, now making buyers delve deeper "into supply chains, employee health, insurance coverage, and other aspects of a target company likely impacted by the pandemic."[279] Deals also took place virtually, as most offices transitioned to virtual operations and needed adequate technology to facilitate the lifecycle. Overall, this exemplifies the significant role that AI has in M&A activity, especially moving forward. Although the in-person aspect of M&A is uncertain, the figures prove that deal work is still pushing forward. AI, therefore, can strengthen the capabilities of firms and prepare for heightened deal terms that COVID-19 created and will likely remain for years to come. Specifically, deal teams can input data points catered to material adverse effect clauses, covenants, and reps and warranties. Once data is transferred, AI systems can produce results in minutes. With this data-driven information, dealmakers can adapt to an expanded diligence process, propose assurances to protect their clients, and reconfigure integration checklists to reflect COVID-related concerns.

As supported, AI software is vital to the advancement of efficient M&A deals. These intelligent programs equip law firms with tools to get deals done faster, better, and at a fraction of the cost. With key insights extracted from data, dealmakers and AI programs simultaneously grow more efficient and add value to clients throughout the lifecycle of a deal. Moving forward, the world is adapting to COVID-19 and its ramifications are increasing the complexity of deals; thus, AI is necessary for firms to maintain a competitive edge and achieve success.

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[278] Panagiotis Bayz et al., *supra* note 277.
[279] *Id.*

CONCLUSION

"Rise early, work late, and strike oil."[280] Oil tycoon J. Paul Getty's formula for success proves relevant in an era where technology is a vital commodity for achievement in global markets. In the legal field, artificial intelligence and the lean process can take out the long-hours-component in this equation for success and, instead, replace it with efficiency throughout the lifecycle of a deal. Moving forward, these improvements to the legal process deliver a cutting-edge solution to providing better, faster, and cheaper representation for clients.[281] Thus, the time is now for law firms to rethink what is possible for the future of mergers and acquisitions and invest in a process that continuously improves.

[280] SCOTT PHILLIPS, MAXIMUM PESSIMISM: SIX VALUE INVESTING TRENDS FROM CHINA TO OIL TO AGRICULTURE (1st ed. 2010).
[281] Doeg, *supra* note 4.