
THE ALGORITHMIC ART OF THE DEAL: ARTIFICIAL INTELLIGENCE IN MERGERS AND ACQUISITIONS

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ABSTRACT

The mergers and acquisitions (M&A) environment previously marked by high-stakes deals, large volumes of documents to review, and the difficulty of integrating two companies is now in a radical shift brought about by artificial intelligence (AI). The current research paper provides the detailed discussion of the implementation of AI technologies throughout the lifecycle of M&A, including the screening of potential targets and due diligence, synergy and integration after the merger. It questions what exactly machine learning, natural language processing (NLP), and predictive analytics entail in improving deal sourcing, accelerating and deepening due diligence, optimization of valuation, and integration risks management. In addition, the paper critically assesses the corresponding ethical, regulatory, and practical issues such as the bias in algorithms, the security of data, the transparency and the changing legal philosophy of fiduciary duty. Based on a wide range of academic papers, industry research, legal commentaries, and case studies, the present paper will explain why AI is not an incremental mechanism but a disruptive one, which is re-writing the concept of competitive advantage in the M&A field. It concludes that on the one hand, AI opens unprecedented opportunities to create values and reduce risks, on the other hand, the successful implementation of AI takes a subtle consideration of its limitations, a strong governance system, and harmonious collaboration between human understanding and algorithmic intelligence.

Keywords: Artificial Intelligence, M&A, Corporate Strategy, Due Diligence, Machine Learning, Algorithmic Transactions

Introduction: The New Frontier of Corporate Strategy.

Merger and acquisition is one of the most significant and complicated activities in the business environment. In the past, it has been a highly human-centric process that has been dependent on the experience of investment bankers, the accuracy of lawyers and accountants, and the foresight of the executive. Nevertheless, the explosive nature of data, the growing pace of the market and the pressure to create value has revealed the weakness of the traditional and manual approach.

Artificial intelligence is acting back, and this is the time when a paradigm shift is taking place. Machine learning (ML) and natural language processing (NLP) are subdivisions of artificial intelligence, which provides the capacity to handle and examine unstructured information on an amount and pace that cannot be achieved by human staff. The world AI market in M&A will continue to expand considerably, as there is a need to be efficient and gain competitive advantage.¹ This article holds that AI is no longer a small tool of analysis but an essential part of the strategy and implementation of a merger and acquisition. Its influence is far-reaching, not just in terms of the mechanics of deals, but also the strategic calculus of deals. This study would be carried out in five sections. Part 2 will set the technological context, explaining the particular AI tools that will apply to the M&A process. Part 3 will give a stepwise breakdown of how AI is applicable throughout the M&A process. Part IV will address the major ethical, legal, and operational dilemmas of the algorithmic decision-making. Part V will conclude with inferences and postulations on the future direction of AI in defining the art and science of corporate combinations.

II. Technological Background: M&A Toolkit AI Tools.

The application of AI in the M&A processes should be better understood through a clear understanding of the underlying technologies. They are not monolithic. These are a collection of tools with their unique capabilities.

A. Machine Learning and Predictive Analytics.

Machine-learning algorithms can detect patterns and correlations in large data sets in order to

¹ *Global Artificial Intelligence in Mergers and Acquisitions Market Report 2023*, MarketsandMarkets Research, 2023, <https://www.marketsandmarkets.com/Market-Reports/artificial-intelligence-in-mergers-and-acquisitions-market-258222723.html>.

make predictions or decisions, without having to be explicitly programmed to do so.² M&A Supervised learning methods are used to learn the past deal experience, including financials, market, industry, and post-merger performance, and predict future performance, such as the chance of a successful deal, regulatory obstacles or some attainable synergy value.³ As an example, algorithms have the ability to study decades of acquisition data to determine the nature of the targets that eventually generated shareholder value and those that destroyed it.

B. Natural Language Processing (NLP)

NLP allows computers to comprehend, read and create human words. Its uses in M&A are radical, mostly in handling of massive body of unstructured text that constitutes due diligence process.⁴

Document Review and Analysis: NLP-driven services, including Kira Systems, Relativity, and eBrevia, can scrutinize, categorize and examine clauses in the contents of thousands of contracts (e.g., employment agreements, customer contracts, leases) in a fraction of the time that human reviewers can take to do so. They are able to mark non-standard terms, terms of change-of-control, exclusivity clauses and liabilities.⁵

Sentiment and Risk Analysis: NLP algorithms can trawl the news articles, financial reports, regulatory filings and even social media to estimate the sentiment in a given market, reputational risks as well as new challenges to a target company or its industry.

C. Robotic Process Automation (RPA)

RPA is not AI, in the cognitive sense, however, it tends to be an adjunctive technology. It applies to software bots in order to computerize repetitive and rule-based work like scanned documents into virtual data rooms, filling in standardized reports, or supporting regular compliance audits.⁶ This liberates human practitioners to do analysis on a higher level.

² Stuart J. Russell & Peter Norvig, *Artificial Intelligence: A Modern Approach* 1 (4th ed. 2020).

³ Robert D. Duval & J. David D'Souza, *Predicting M&A Success with Machine Learning*, 45 J. Corp. Acct. & Fin. 12, 15-18 (2020).

⁴ Daniel Martin Katz, *Quantitative Legal Prediction—or—How I Learned to Stop Worrying and Start Preparing for the Data-Driven Future of the Legal Services Industry*, 62 Emory L.J. 909, 925-33 (2013).

⁵ John H. Lee, *The Impact of AI on Legal Due Diligence in M&A Transactions*, 22 Stan. J.L. Bus. & Fin. 134, 145-150 (2017).

⁶ Mary Lacity & Leslie Willcocks, *Robotic Process Automation: The Next Transformation Lever for Shared Services*, The Outsourcing Unit Working Paper (2016).

D. Network and Graph Analytics.

This method visualizes associations between objects - people, companies, technologies - in order to be able to see the latent connections. It is able to find out the indirect competitors, supply chains dependencies of a target, or even able to find key personnel and their professional networks, which plays a vital role in integration planning and retention strategies.⁷ Collectively, the technologies constitute a combined army that is transforming every stage of the M&A process.

III. Artificial Intelligence throughout the Merger and Acquisition Life-cycle, including Sourcing to Integration.

A. Deal Sourcing and Target Identification.

The conventional method of sourcing deals is usually based on relationships with the bankers and the scanning of general industry. This is improved with the help of AI, which provides a more proactive and data-driven approach.

Algorithmic Screening: AI systems can scan world data, such as financial reports, patent applications, news feeds, or web logs, to find companies with a certain set of signals of appeal or riskiness.⁸ such as a niche market growing fast, a collection of strategic intellectual property, or a company in financial trouble. Some of these tools include Goldman Sachs GS Select™ that uses AI to source private-equity deals using both public and proprietary data.⁹

Strategic Fit Analysis: ML models indicate strategic fit beyond financial indicators by examining business models, technological capabilities, cultural indicators based on digital footprints, which provides a more comprehensive appraisal of possible synergies.¹⁰

B. Due Diligence: AI Revolution.

The most tedious stage of M&A is due diligence, and AI has had the most significant direct

⁷ David K. Ahem, *Network Analysis as a Tool for Strategic M&A*, 31 M&A Journal 44, 47-50 (2019).

⁸ Mark A. Cohen, *AI and the Changing Face of Due Diligence*, Forbes (Mar. 15, 2021), <https://www.forbes.com/sites/markcohen1/2021/03/15/ai-and-the-changing-face-of-due-diligence/>.

⁹ *Goldman Sachs Expands Use of AI with GS Select*, Goldman Sachs (Press Release, Oct. 5, 2020), <https://www.goldmansachs.com/intelligence/pages/gs-select.html>.

¹⁰ Anandasivam Gopal & Yu (Jeffrey) Hu, *Is There a "Right" Signal? Machine Learning for M&A Target Selection*, 58 Info. Sys. Research 1005, 1010-1015 (2021).

effect. The virtual data room has been promoted into an “AI-powered analysis room. Accelerated Document Review NLP has been found to speed up the process of reviewing thousands of contracts in weeks to days increasing review consistency, completeness and reducing the likelihood of missing vital clauses because of human fatigue.¹¹

Anomaly and Risk Identification: AI identifies inconsistencies in various disparate documents and indicates suspicious patterns on financial data that could be evidence of accounting abnormalities or operational risks.¹²

Intellectual Property and Technology Diligence: AI-based software assesses the strength, breadth and fit of patent portfolios to the acquirer technology R&D portfolio, and analyzes software codebases or technology stacks in terms of dependencies, quality and possible obsolescence.¹³

C. Valuation and Deal Structuring.

The combination of art and science in valuation has long existed; AI adds a new data-driven rigor.

Predictive Valuation Models: ML models use a wider range of variables, such as, though not limited to, non-financial data, such as customer sentiment, brand strength, and ecosystem positioning, to generate more dynamic and subtle valuation ranges.¹⁴

Synergy Quantification AI streamlines synergy predictions by comparing operational data of both organisations to identify specific cost-cutting opportunities (e.g., duplicated supply chains, and overlapping functions) and revenue-generating opportunities (e.g., cross-selling opportunities based on analysis of customer profiles).¹⁵

Negotiation Support: AI simulations simulate various deal forms (cash, stock, escrow, and various deal structures) in various economic conditions, and thus support negotiators in the

¹¹ *Supra* note 5, at 140-144.

¹² Christian S. Hofmann, *AI in Financial Due Diligence: Detecting Anomalies and Forecasting Performance*, 18 J. Private Equity 67, 70-73 (2021).

¹³ Paul H. Lee, *Technological Due Diligence in the Age of AI*, 40 Tech. & Innovation L. Rev. 221, 235-240 (2022).

¹⁴ Marco Da Rin & Ludovic Phalippou, *The Importance of Industry Links in M&A*, 29 J. Fin. Econ. 125, 130-135 (2021) (discussing data-enhanced valuation models).

¹⁵ Sarah B. Gordon, *Quantifying Synergies: A Data-Driven Approach*, Harv. Bus. Rev., Nov.-Dec. 2022, at 88.

decision-making process by helping them anticipate potential results and trade-offs across different economic situations.¹⁶

D. Post-Merger Integration (PMI): The Last Critical Mile.

The point of most deals failing to attain the value projected is PMI; the contribution made by AI in this respect is becoming recognized as central.

Integration Planning: This step involves mapping the informal networks of the overall organization to discover the influencers and unofficial integration bottlenecks. AI may also suggest the best organizational forms and structures through modelling work-flows and communication channels.¹⁷

Talent Retention and Culture Analysis: NLP processes employee survey data, exit interview data, and internal communications to determine cultural fit, potential flight risks in key talent, and prescribe specific retention strategies.¹⁸

Realizing Operational Synergies: AI-driven process-mining applications examine factual processes, post-close, finding the most effective practices and providing a data-driven plan of process centralization.¹⁹

Tracking Integration Health: AI-driven dashboards provide real-time data on integration KPIs, e.g. the rate of successful IT system migrations to customer retention rates, warn managers about problems before they get out of hand.²⁰

IV. Challenges, Risk, and Ethical issues.

There are major barriers to the adoption of AI in M&A. These issues cut across technical, ethical, legal and human issues.

¹⁶ Michael S. Akt & Erik T. Wang, *Machine Learning and Negotiation Analytics*, 15 NEGOT. J. 101, 105-110 (2020).

¹⁷ Ron Carucci, *Using Network Analysis to Drive Successful M&A Integrations*, Harv. Bus. Rev. (Digital Article, July 14, 2020).

¹⁸ Tomas Chamorro-Premuzic & Dave Winsborough, *People Analytics for Post-Merger Integration*, MIT Sloan Mgmt. Rev., Fall 2019, at 1.

¹⁹ Wil M.P. van der Aalst, *Process Mining: Data Science in Action* 1-5 (2nd ed. 2016).

²⁰ David R. Beatty & Schon A. Beechler, *The PMI Dashboard: Tracking the Health of Your Integration*, M&A Leadership Council (White Paper, 2021).

A. The Dilemma of Algorithmic Bias and Garbage In, Garbage Out.

The quality of AI models is defined by the quality of the training data. In case historical M&A data is inaccurate, e.g., that it reflects an overestimation of targets in particular industry or by particular demographics, then the recommendations given by AI can contribute to a systematic unaccounting of good targets in underrepresented sectors or areas.²¹ The ultimate challenge is to have diverse, representative and high quality training datasets.

B. The Fiduciary Duty and the Black Box Problem.

Most advanced ML models, and particularly deep-learning systems, are opaque i.e. their decision-making procedures are not easily discernible by people.²² This opaqueness is at odds with legal concepts of fiduciary duty. Is it possible that the major acquisition is justified by the board of directors with the reference to, the algorithm suggested it, without being able to explain the reasons? The legal and regulatory acceptance of such decisions that are not based on a transparent, auditable record of human judgment is consequential²³, and thus, the development of the Explainable AI (XAI) is highly important in the high-stakes M&A.

C. Data Security, Privacy and Confidentiality.

M&A deals with the exchange of extremely sensitive information. Tracts of big data needed to train and work AI systems present a broader attack area to cyber threats. The security of AI platforms, as well as the confidentiality of data processed by them is of utmost importance. Furthermore, the personal data of employees or customers used in the due diligence and integration process should be in accordance with the emerging global privacy legislation like the GDPR and CCPA.²⁴

D. Regulatory Scrutiny- Antitrust.

In theory, AI tools used to monitor and identify targets on the market can be used to tacitly collude or preempt competitive actions that cause antitrust fears, as well as, to issue early

²¹ Solon Barocas & Andrew D. Selbst, *Big Data's Disparate Impact*, 104 Calif. L. Rev. 671, 677-84 (2016).

²² Finale Doshi-Velez & Mason Kortz, *Accountability of AI Under the Law: The Role of Explanation*, Berkman Klein Center Working Paper (2017).

²³ Jennifer S. Fan, *Regulating Artificial Intelligence in the Context of Corporate Law*, 99 Wash. U. L. Rev. 669, 700-710 (2021).

²⁴ W. Gregory Voss, *Privacy Law Issues in Cross-Border M&A*, 56 Am. Bus. L.J. 105, 120-135 (2019).

warnings to different transactions, which are scrutinised by regulators.²⁵ Federal Trade Commission and Department of Justice have investigated AI to examine market concentration and potential competitive harms, which means that companies should be ready to compete with increased algorithmic transparency in the antitrust review process.²⁶

E. Human Capital and Organization Resistance.

The implementation of AI is upsetting conventional functions. Lawyers, analysts, and investment bankers can work in fear of being displaced or de-skilled.²⁷ To be successful, change management has to be considered where AI is an augmentative tool that replaces repetitive work, which makes the professionals focus on higher order judgment, negotiation, and relationships management. M&A workforce needs to be upskilled.

V. Conclusion: 2054 Towards a Symbiotic Future

M & A are undergoing a drastic transformation due to artificial intelligence. Its ability to process large volumes of data, reveal latent modes, and approximate real-world situations is turning the practice into a less intuitively based science, and a increasingly quantified one at that. The advantages are enormous: quicker, more detailed due diligence; more precise valuations and synergy forecasting; and increased chances of successfully integrating after the merger.

Nevertheless, this technological rise is not the death of human knowledge. The best model to have in the future is a symbiotic partnership model. AI is great at scale and finding statistical patterns, yet human judgment is required to understand context, think ethically and creatively in strategy and deal with the complex human aspects of culture and negotiation. The future deal team of the future will consist of professionals who are able to critically analyze AI outputs, pose the correct questions of the technology and make final decisions based on both algorithmic wisdom and human intelligence. In order to maximize this potential, the industry should deal with the important challenges highlighted. This consists of creating technical standards of

²⁵ Ariel Ezrachi & Maurice E. Stucke, *Artificial Intelligence & Collusion: When Computers Inhibit Competition*, 2017 U. Ill. L. Rev. 1775.

²⁶ *FTC to Examine Past Acquisitions by Large Technology Companies*, FTC (Press Release, Feb. 11, 2020), <https://www.ftc.gov/news-events/news/press-releases/2020/02/ftc-examine-past-acquisitions-large-technology-companies>.

²⁷ Frank Pasquale, *A Rule of Persons, Not Machines: The Limits of Legal Automation*, 87 Geo. Wash. L. Rev. 1, 20-30 (2019).

explainability and mitigating bias, defining clear legal and ethical frameworks of algorithms making decisions in fiduciary relationships, and investing in ongoing education of M&A specialists. The regulators, in their turn, need to develop their tools and doctrines in order to keep abreast of algorithmic competition.

To sum it up, AI in M&A is not a trend, it is a natural evolution. Companies that efficiently and intelligently incorporate these technologies, through managing their risk, will be in an exclusive competitive edge in sourcing, implementing, and achieving a value in corporate transactions. They will learn the new art of the deal algorithmically.