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Legal aspects of AI-driven Due Diligence in Real Estate Investments:  
Case studies in Corporate Finance

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# TABLE OF CONTENTS

<b>INTRODUCTION</b>	pag. 4
<b>CHAPTER ONE</b>	
• Background and context of AI in real estate investments	pag. 5
• Research objectives and questions	pag. 18
• Significance and relevance of the study	pag. 19
• Scope and limitations	pag. 21
• Methodology and research approach	pag. 22
<b>CHAPTER TWO</b>	
• Overview of due diligence in corporate finance.	pag.24
• The evolution of due diligence in real estate	pag.28
• AI use cases in real estate due diligence	pag.30
• Impact of AI on real estate investments	pag.32
• Legal and regulatory framework	pag.34
<b>CHAPTER THREE</b>	
• Opportunities and risks of AI in real estate	pag.49
• Geopolitics and regulation of AI	pag.53
• Future trends and jurisprudential implications	pag.61
<b>CHAPTER FOUR</b>	
• Privacy management using AI	pag.66
• The cybernetics of law in the real estate sector	pag.71
• Practical cases.	pag.76
<b>CONCLUSION</b> .....	pag. 80
<b>SUMMARY</b> .....	pag. 83
<b>BIBLIOGRAPHY</b> .....	pag. 84

## **Introduction**

The purpose of this thesis is to explore the intersection between artificial intelligence (AI) and due diligence in real estate investments. With AI technologies making a significant impact across various industries, it is important to carefully examine its potential impact on the due diligence process, which is crucial for making sound investment decisions. This study investigates the legal implications and practical applications of AI-driven due diligence, identifying potential areas of legal uncertainty and the need for regulatory adaptation. It also features real-world case studies from the corporate finance sector to showcase how AI can enhance efficiency, accuracy, and risk assessment in real estate due diligence. Moreover, this thesis proposes a roadmap for the ethical and responsible implementation of AI in real estate due diligence. It advocates for a collaborative approach between legal professionals, financial institutions, and technology providers to navigate the evolving legal landscape. The study highlights the importance of proactive measures to address legal concerns that may arise with the use of AI in due diligence. Ultimately, the thesis concludes by emphasizing the significance of the ethical and responsible use of AI in real estate due diligence to benefit investors and the broader real estate market. It stresses the importance of a balanced approach that considers both legal and practical considerations of AI-driven due diligence.

## **Chapter 1**

### **Foundation of AI Integration in Real Estate Investments**

#### **1.1 Background and Context of AI in Real Estate Investments**

In the contemporary era, artificial intelligence (AI) has emerged as a groundbreaking technology across various industries, significantly transforming how we live, work, and engage in everyday activities. The real estate industry is a prime example of a sector profoundly impacted by this technological wave.

AI integration has fundamentally altered the landscape of real estate, introducing both opportunities and challenges. One major impact of AI is in personalized property searches. Intelligent algorithms now facilitate these searches by comprehending buyer preferences, budget constraints, and various property attributes. They consider factors such as location, amenities, safety, and even sunlight exposure to offer customized recommendations. These AI algorithms continually learn and evolve based on user interactions, transforming the property buying process into a tailored service.

AI also plays a crucial role in property valuation and price prediction. By analyzing vast datasets that include historical sales, market trends, and macroeconomic indicators, AI-powered technologies provide precise price predictions. These predictions help investors make informed decisions about potential acquisitions.

Moreover, AI-powered technologies like Virtual Reality (VR) and Augmented Reality (AR) have revolutionized property viewings by providing immersive experiences that eliminate geographical constraints. These technologies became especially valuable during the COVID-19 pandemic, enabling detailed property tours from the comfort of one's home. AI contributes to creating 3-D models and enhancing virtual tours by identifying key features and personalizing experiences based on buyer preferences. Additionally, AI suggests modifications or improvements to properties, further enhancing the interactive elements of AR and VR tours. During virtual tours, chatbots integrated

with AI provide comprehensive information on the property, neighborhood, and financing options, creating a user-friendly property buying experience.

In the operational realm, AI has significantly streamlined the paperwork associated with real estate transactions. Tasks such as contract review, due diligence checks, and regulatory compliance management, traditionally manual and time-consuming, are now automated. This automation enhances efficiency, reduces time and costs, and minimizes the risk of human errors, ensuring a more reliable transactional experience for all parties involved.

The real estate industry involves numerous tasks and processes, including contract review, due diligence, customer service, and property management. Traditionally, these tasks required significant time investments and were prone to human error. However, the integration of AI-powered tools is transforming the sector, enabling an unparalleled level of efficiency and accuracy. The continuous advancements in AI, AR, and VR technologies promise even more sophisticated tools, making real estate processes more efficient and interactive.

### **1.1 The History of Artificial Intelligence and Its Evolution in Real Estate**

The emergence of Artificial Intelligence (AI) has resulted in a significant paradigm shift across various sectors, including real estate, reshaping how we approach property transactions, management, and investment. The developmental journey of AI can be traced back to its foundational theories and subsequent advancements, leading to its current applications and potential future prospects in real estate.

The roots of AI trace back to ancient philosophical inquiries into cognition, but modern AI began to take shape with Ada Lovelace's insights into symbolic computation and Alan Turing's conceptualization of universal computation through the Turing Machine. These foundational ideas set the stage for the formal recognition of AI as a distinct field.

The mid-20th century was a pivotal period in AI's development, marked by the Dartmouth Conference in 1956, where the term "Artificial Intelligence" was coined. This era saw the

development of the perceptron by Frank Rosenblatt, an early neural network model, and the introduction of Lisp by John McCarthy, a programming language that advanced AI research.

Despite early successes, AI research experienced the "AI Winters" of the 1970s and 1980s, characterized by reduced funding and interest. However, even during these periods, there were significant advancements in specialized systems, such as Dendral, which influenced problem-specific AI applications. These systems laid the groundwork for future AI solutions in real estate by demonstrating the potential of expert systems in decision-making processes.

The advent of the internet in the late 20th century provided an abundance of data crucial for training machine learning algorithms. This data influx propelled advancements in AI, with notable milestones such as IBM's Deep Blue defeating world chess champion Garry Kasparov in 1997 and IBM's Watson winning Jeopardy! in 2011. These achievements showcased AI's potential in handling complex problems and natural language processing, skills essential for real estate applications.

In the real estate sector, AI's evolution has led to transformative tools and technologies. Early AI applications focused on data analysis and predictive modeling for property valuation and market trend analysis. As AI technologies advanced, their capabilities expanded to include personalized property search engines, virtual property tours using VR and AR, and automated customer service through chatbots.

In the 2020s, AI development is epitomized by models like OpenAI's Generative Pre-Trained Transformers (GPT), particularly GPT-3, which leverage vast datasets to produce human-like text. In real estate, these models enhance customer interactions, generate property descriptions, and provide detailed market analysis. Anticipated advancements, such as future iterations like GPT-5, promise further enhancements in AI's reliability and efficiency.

However, the rapid advancement of AI in real estate also raises important ethical and regulatory considerations. The potential achievement of Artificial General Intelligence (AGI), where AI systems could perform any intellectual task that a human can, prompts

significant discussions about implications for property management, data privacy, and security. These concerns highlight the need for robust regulatory frameworks and ethical guidelines to ensure the responsible development and deployment of AI technologies in the real estate sector.

## **1.2 The Current State of the Real Estate Industry and Its Challenges**

In recent years, forecasters have faced significant challenges in predicting economic, financial, and real estate market conditions. The macroeconomic picture of 2024 is anticipated to be mixed, with economic growth and fundamentals expected to vary across markets. Risks are weighted towards the first half of the year, but broader momentum is likely to return as the year progresses. The extreme post-pandemic highs and lows in property sectors are forecasted to transition back to historical trend lines, offering more predictable outcomes.

Real estate credit strategies will remain under scrutiny, particularly in the face of an elevated interest rate environment. Balancing defensive and offensive strategies will be crucial for real estate investors, as will the ability to deploy resources effectively and make confident decisions amidst uncertainty. In oversupplied office markets, occupiers are expected to vie for prime properties in high-demand segments, reflecting a preference for quality.

Successful investors will need to prioritize long-term strategic objectives and navigate existing challenges and uncertainties to capitalize on opportunities. Heading into 2024, economic conditions appear resilient but uneven across real estate markets. Risks remain elevated, and predictability is likely to emerge gradually throughout the year. While inflation and recession risks persist, progress in controlling inflation by central banks has been noted. Nonetheless, the effects of monetary tightening, geopolitical instability, and election uncertainty pose additional risks to the outlook.

Inflation is receding in major economies, bringing greater predictability to consumer and producer prices. Interest rates in developed economies have peaked after aggressive



monetary tightening, and borrowing costs are expected to stabilize until mid-to-late 2024. Pandemic-related disruptions have largely subsided, aligning logistics demand more closely with historical trends.

Office utilization has improved globally, with a gradual increase expected in 2024, particularly in the U.S., contributing to the revitalization of central business districts. Real estate investors in 2024 face the challenge of balancing financial and asset management within existing portfolios while seeking opportunities in high-demand assets. Loan maturities are expected to catalyze transaction activity and, in some cases, distress, providing clearer property value data for stakeholders.

Occupiers are expected to refine workplace policies and align portfolio strategies with new work patterns. Upgrading existing facilities and emphasizing sustainability will be critical as organizations adapt to dynamic workplaces and leverage technology to harness workplace data effectively. Overall, the real estate market in 2024 presents opportunities for investors and occupiers to execute strategies amidst relative macroeconomic stability. Navigating existing challenges and uncertainties will be essential for success, presenting a window of opportunity for those able to make informed decisions and prioritize long-term strategic objectives.

### **1.3 How AI Has Impacted the Real Estate Industry**

In today's discourse on whether AI will supplant human labor, it's undeniable that artificial intelligence is rapidly gaining ground across diverse industries. Its adoption is reshaping global sectors, enhancing existing processes, and opening new avenues. Real estate stands as a prime example of an industry embracing AI, evident in the proliferation of AI-powered tools and software facilitating interactive property experiences and client-agent communication.

Reports and forecasts project a continued surge in AI utilization, not only in real estate but also across various sectors. For instance, the Global Industry Analysis and Forecast

by Maximize Market Research estimates that the Artificial Intelligence (AI) in the Real Estate Market will reach US \$1335.89 billion by 2029.

At its core, AI involves crafting computer programs and systems capable of emulating human-like intelligence, encompassing learning, problem-solving, and decision-making. In real estate, AI applications streamline property searches, predict prices, analyze markets, automate management tasks, and enhance overall transaction efficiency.

The impact of AI on the real estate industry is profound. Features like machine learning, natural language processing (NLP), recommendation systems, and predictive analytics hold the promise of revolutionizing the real estate experience for buyers, sellers, and investors. AI-powered technologies are already making significant strides across various real estate sectors, with further advancements anticipated as AI evolves.

Several key areas highlight how AI is transforming the real estate industry:

- **Property Search and Recommendations:** AI algorithms can analyze vast amounts of data to understand buyer preferences and constraints, providing highly personalized property recommendations. These systems consider factors such as location, price, amenities, and even personal tastes to deliver tailored suggestions.
- **Price Prediction and Market Analysis:** By utilizing machine learning models, AI can analyze historical sales data, market trends, and economic indicators to predict property prices accurately. This helps investors make informed decisions and identify lucrative investment opportunities.
- **Automated Property Management:** AI streamlines property management tasks such as maintenance scheduling, tenant communication, and contract management. This automation reduces operational costs and improves efficiency for property managers and owners.
- **Enhanced Customer Experience:** AI-driven chatbots and virtual assistants provide immediate responses to customer inquiries, schedule property viewings, and offer detailed information about properties. This enhances the client-agent communication and provides a more seamless customer experience.

- **Virtual and Augmented Reality:** AI integrates with VR and AR technologies to offer immersive property tours. Potential buyers can explore properties remotely, experiencing a realistic sense of space and layout without the need for physical presence.
- **Predictive Maintenance and Risk Management:** AI systems can predict maintenance needs and identify potential issues before they become critical, helping property managers to address problems proactively. This reduces downtime and maintenance costs, ensuring properties remain in optimal condition.

Looking ahead, several trends forecast the future trajectory of AI in real estate. Advanced analytics, emotion analysis in property marketing, neighborhood life quality analysis, predictive property value trends, and tenant screening using AI are just a few examples of the vast potential applications.

Moreover, AI offers benefits across various aspects of the real estate industry, including improved property valuation, streamlined property management, efficient lead generation, personalized customer experiences, and enhanced security. By harnessing AI capabilities, real estate professionals can make data-driven decisions, gain valuable market insights, and achieve increased operational efficiency.

As we navigate through a period of digital transformation, AI is poised to play a pivotal role in reshaping real estate operations. To remain competitive in this AI-driven landscape, it is essential for businesses to align their strategies with AI adoption, leveraging its transformative potential to stay ahead of the curve.

#### **1.4 The Different AI-Powered Tools Used in the Real Estate Industry**

The integration of AI into the real estate industry has brought about significant advancements, particularly in the efficiency and accuracy of various processes. Here are some key areas where AI-powered tools are making a substantial impact:

- **Contract Review and Due Diligence:** The meticulous examination of property agreements for potential risks has traditionally been a time-consuming and

inefficient process. AI-powered contract analysis tools automate this task, leveraging natural language processing (NLP) to comprehend contract language, identify key clauses, and flag potential issues. This technology significantly transforms the due diligence process, enabling quick sifting through documents, highlighting relevant information, and identifying red flags, thereby improving efficiency and reducing human error.

- **Regulatory Compliance and Document Management:** AI plays a pivotal role in automating the verification of transactions against relevant laws and regulations, ensuring adherence to legal requirements. Additionally, AI contributes to document management by automating tasks such as sorting, filing, and retrieving documents through optical character recognition (OCR). This streamlines the transaction process and reduces the likelihood of errors.
- **Customer Service:** AI-powered chatbots enhance customer service by providing instant responses to queries. These chatbots can engage in conversations, understand complex questions, and provide satisfactory answers. Operating 24/7, they free up human customer service agents to handle more complex issues. AI chatbots also learn from interactions, continuously improving their ability to understand and respond to queries, which allows them to handle a large volume of queries simultaneously and anticipate customer needs based on past interactions.
- **Property Management:** AI holds great potential in property management. Integration of AI into building management systems allows for the optimization of energy usage, efficient maintenance scheduling, and enhanced security protocols. AI analyzes usage patterns to predict maintenance needs and automatically schedules them, improving building management efficiency. Smart building systems adjust heating or cooling based on weather forecasts and occupancy patterns, contributing to substantial energy savings and promoting sustainable real estate practices. Predictive maintenance monitors key components, ensuring efficient operation and avoiding unexpected breakdowns.
- **Security and Surveillance:** AI enhances safety protocols through advanced surveillance systems that identify unusual activities and differentiate between typical and atypical human behavior. Access control systems benefit from AI

technologies like facial recognition, ensuring secure building access. AI-powered property management systems handle tenant inquiries and maintenance requests round-the-clock, ensuring swift responses and high tenant satisfaction.

- **Smart Home Technology:** AI is integral to smart home devices like Amazon's Alexa and Google Home, which automate tasks such as lighting control, appliance management, and security. These devices offer enhanced comfort, security, and convenience, presenting opportunities for real estate developers and technology providers. AI-powered smart home systems provide hands-free control of various functions and automate tasks based on user behavior, enhancing the living experience. AI-powered cameras use facial recognition and can detect unusual activity patterns, alerting homeowners to potential threats. Smart thermostats learn household routines and optimize energy usage, reducing energy wastage and saving money.
- **Risk Assessment and Investment Analysis:** AI plays a significant role in risk assessment and mitigation in real estate investment. By analyzing complex and diverse datasets, AI algorithms predict risks associated with properties or investments, providing investors with accurate assessments for safer and more profitable decisions. AI can evaluate the likelihood of natural disasters by analyzing historical weather data and environmental factors. Additionally, AI forecasts market volatility by analyzing economic data, housing market trends, interest rates, and employment rates, providing insights into potential market downturns or price fluctuations. AI also assesses neighborhood safety by analyzing public crime data, advising clients on investment properties, and setting appropriate rental prices. Furthermore, AI examines data from home inspections, maintenance records, and IoT devices to predict potential structural issues or appliance failures, enabling investors to anticipate repair costs and negotiate fair purchase prices.

By utilizing AI for diverse risk assessments, investors can make more informed decisions, resulting in safer investments and enhanced profitability by avoiding unforeseen costs or depreciation. The integration of AI in risk assessment is shaping a future where data-driven insights dominate real estate investment strategies.

## **1.5 The future of AI in the real estate industry and potential advancements.**

Artificial intelligence (AI) is revolutionizing the real estate industry, driving significant innovations and reshaping industry dynamics. Market analyses reveal that AI has profoundly impacted real estate operations by automating repetitive tasks such as property inspections and showings. This not only saves valuable time and resources for agents and clients but also enhances overall operational efficiency. With its ability to process extensive datasets, AI provides real estate professionals with valuable market insights, enabling more informed decisions on property prices, rental rates, and market trends.

AI technology also contributes to offering personalized and tailored services to clients. Customized property recommendations and virtual tours based on individual preferences and search history significantly enhance the overall client experience. Advances in AI and machine learning algorithms empower the industry to analyze large volumes of data swiftly and accurately, leading to improved decision-making capabilities.

Despite its tremendous potential, AI is currently in a middle stage of development within the real estate sector. Companies must ensure the accuracy and impartiality of the data used to guarantee reliable results and predictions from AI systems. The ongoing progress in computing, coupled with AI advancements, indicates a transformative era for the real estate industry, promising increased efficiency, accuracy, and personalization of client services.

As computing progresses, AI intersects with other cutting-edge technologies, notably virtual reality (VR) and 5G. This synergy is a key driver of the fourth industrial revolution, unlocking opportunities for automation, efficiency, and innovation across various industries. In real estate, the integration of AI, VR, and 5G holds the promise of real-time streaming of VR content, allowing users to experience high-quality, interactive virtual environments. These technologies optimize and manage 5G networks and create new services and applications, transforming the real estate landscape and delivering more immersive customer experiences.

The application of AI transcends real estate, impacting sectors such as intelligent cities, technology, vehicle manufacturing, marketing, healthcare, and engineering. In real estate,

AI fosters innovations and drives customized solutions for end markets. AI is expected to simplify, secure, and make the transfer of ownership rights more cost-effective. Long-term integration of AI will have a substantial and far-reaching impact on the real estate sector.

Several trends are already emerging in different aspects of the real estate field. AI companies and investments tend to cluster around well-established tech markets, with growth expected in locations with a pool of AI talent, such as tech hubs, innovation centers, and universities. The development of AI necessitates increased demand for enhanced data centers, robust energy grids, and improved connectivity infrastructure, altering asset demand.

The emergence of the 'real intelligent building' is one of the most exciting prospects of AI in real estate. AI-compliant infrastructure is poised to become standard, akin to the ubiquity of internet connections in current buildings. AI will contribute to creating net-zero buildings with high sustainability performance. AI-powered underwriting and processes are expected to facilitate quicker transactions and a more efficient understanding of properties and markets, potentially increasing global investments. AI-compliant infrastructure and the ability to integrate various systems might also pave the way for the expansion of 'space as a service' models, creating new revenue streams for landlords and developers.

In terms of design and space function, AI will enable experience-driven design and highly customizable environmental settings, influencing how spaces are conceived and utilized. The real estate sector is actively embracing and incorporating new technologies, as indicated by JLL's 2023 Global Real Estate Technology Survey. The surge in real estate technology investment, with over 80% of occupiers, investors, and developers intending to increase their budget for real estate technology within the next three years, is driven by the maturation of the PropTech ecosystem. This ecosystem covers nearly every aspect of real estate functions, from investment management to building operations, setting the stage for seamless integration of AI and building a robust foundation for future advancements.

AI offers several key applications in the real estate sector, including document sorting and data standardization, IoT data mining, price modeling and prediction, satellite image processing, reality capture, scheduling for construction and capital projects, and recommendation and matchmaking. These applications can streamline portfolio data analytics and benchmarking, automate the management of facilities, enhance efficiency in construction projects, and improve investment strategies.

Significant uncertainties persist regarding the future impact of AI, including its rapidly expanding capabilities and the specific assimilation of these capabilities into various industry sectors. Therefore, it is imperative that real estate investors, developers, and corporate occupiers remain well-informed and strategic, considering how to harness the potential of AI to support business objectives while adhering to responsible and ethical practices. As the regulatory landscape for AI evolves to keep pace with its growth, businesses need to maintain vigilance in emerging regulations, including market standards and protocols, regulations to mitigate societal risks, and ensuring transparency and accountability. Compliance with established standards in these areas is crucial for responsible AI integration that benefits all stakeholders.

### **1.6 Ethical implications of AI in the real estate industry**

The integration of artificial intelligence (AI) into the real estate sector offers significant advancements but also raises important ethical considerations. A primary concern is the potential for bias and discrimination in property pricing decisions. AI algorithms rely heavily on historical data, and if this data contains biases or discriminatory practices, the algorithms may inadvertently perpetuate these issues, resulting in unfair pricing and discriminatory practices within the real estate market.

To address this issue, it is crucial to ensure that AI algorithms are developed and trained to mitigate bias and discrimination. This involves careful scrutiny of the data used for training and continuous monitoring of algorithm performance to detect and rectify any emerging biases. Establishing regulations and guidelines to govern AI usage in real estate is essential to uphold ethical standards and prevent discriminatory practices.



Another ethical concern in AI implementation for real estate is data protection. AI algorithms rely on vast amounts of personal data for predictions and recommendations, necessitating proper regulations and protocols for data collection, storage, and usage. This includes obtaining informed consent from individuals whose data is utilized, ensuring data security and confidentiality, and granting individuals control over their personal information.

Transparency and accountability are paramount when deploying AI algorithms in real estate. Clearly defining the role of AI in decision-making processes and ensuring human oversight and accountability are essential. While AI algorithms can provide valuable predictions and recommendations based on data analysis, human judgment and expertise are crucial in evaluating and interpreting these insights to ensure decisions are made holistically and contextually.

The integration of AI in the real estate industry also has the potential to impact housing affordability and accessibility significantly. AI algorithms can analyze vast datasets to identify patterns and provide insights into the housing market. This information is invaluable for developing strategies to address housing affordability challenges and improve accessibility. Real estate professionals can leverage AI technologies to gain insights into market trends, supply and demand dynamics, and pricing patterns, helping to identify areas requiring affordable housing and guiding policy development. Additionally, AI can identify barriers to accessibility, such as gaps in transportation infrastructure, aiding in devising solutions to overcome these obstacles.

Furthermore, AI can democratize the housing market by providing information to prospective buyers and sellers, empowering individuals to make informed decisions about housing choices. This has the potential to level the playing field and improve access to housing for diverse individuals and communities.

Embracing AI technologies while adhering to ethical practices ensures that the real estate industry can harness the full potential of AI. This approach maintains ethical standards and ensures equitable access to housing for all individuals and communities. Real estate professionals must be aware of these ethical implications, particularly concerning

property pricing and data protection, to navigate the integration of AI responsibly and effectively.

### **1.7 Research Objectives and Questions**

The current and future impact of artificial intelligence (AI) on the real estate industry remains uncertain. As AI expands and evolves, questions arise concerning its capabilities, integration into industry sectors, and potential benefits for business objectives. Navigating this evolving landscape is paramount for real estate investors, developers, and corporate occupiers.

To effectively integrate AI into the real estate industry, it is crucial to not only grasp its potential benefits but also to ensure responsible and ethically sound practices. Adherence to emerging regulations governing data quality, intellectual property rights, privacy, and data security is essential. Compliance with these standards ensures the responsible integration of AI and guarantees that the technology is used ethically. Real estate organizations must be vigilant regarding three pivotal categories of emerging regulations: market standards and protocols, societal risk mitigation, and environmental legislation.

Understanding these legal implications is vital to creating a comprehensive test and implementation strategy. Organizations must anticipate and comply with regulations designed to mitigate societal risks, establish safety standards for autonomous vehicles, and align with environmental legislation to reduce carbon emissions from the expanding digital economy. By doing so, they can mitigate legal risks and harness the immense potential for growth that AI presents in the realm of real estate.

In charting a path forward, organizations must address key legal questions concerning investment and location strategies, AI applications, and potential risks associated with AI integration in the real estate sector. Key questions include:

- **Investment and Location Strategies:** How will the growth of AI influence investment and location strategies across existing or emerging asset classes?

- **Preparation for AI Applications:** What existing or future applications of AI should organizations be prepared for and consider piloting now?
- **Risk Assessment:** What are the potential legal, business, and societal risks associated with the integration of AI in the real estate sector?

Addressing these questions requires a deep understanding of the legal implications of AI, enabling organizations to develop robust strategies for test and implementation. By adhering to emerging regulations and understanding the associated legal implications, organizations can mitigate risks and effectively integrate AI into the real estate industry.

The integration of AI into the real estate industry presents both opportunities and challenges. Organizations must approach this integration responsibly and ethically, ensuring compliance with emerging regulations. This approach will allow them to harness AI's potential for growth while maintaining high ethical standards and addressing the complex legal landscape of AI in real estate.

### **1.8 Significance and Relevance of the Study**

The study on the transformative impact of artificial intelligence (AI) in the real estate industry is a comprehensive analysis that holds significant relevance across multiple dimensions.

This research conducts an in-depth examination of various AI applications, ranging from property recommendations to compliance automation, showcasing the potential for substantial innovation and efficiency improvements within the real estate sector. As industries worldwide increasingly adopt AI technologies to streamline processes, reduce costs, and enhance overall performance, this study is particularly timely and pertinent.

The study aims to provide valuable insights for industry professionals and policymakers, emphasizing the importance of strategic decision-making in a rapidly evolving technological landscape. Understanding the implications, benefits, and challenges of integrating AI in real estate is crucial for making informed decisions that can shape the future of the industry. By critically discussing potential challenges such as data privacy concerns, algorithmic biases, and job displacement, the study contributes to a more

holistic understanding of AI adoption's implications. This information is relevant not only for industry stakeholders but also for policymakers seeking to develop regulations that balance innovation with ethical considerations.

The practical implications of the study extend to several key groups: industry professionals can gain insights into how AI can enhance efficiency and accuracy, guiding their operational strategies and helping them stay competitive in a technology-driven market. Policymakers can use the study to inform regulatory measures, ensuring responsible AI adoption that protects consumers and promotes fair practices. Technology developers, understanding sector-specific applications and concerns, can design better AI systems tailored to the real estate industry's needs.

The study's originality lies in its multi-faceted examination of AI applications, coupled with a critical discussion on potential challenges. In the context of rapid technological change, such comprehensive studies are rare, adding to the paper's significance. It contributes to the broader discourse on AI's societal implications, presenting both benefits and drawbacks, and emphasizing the need for responsible integration. Moreover, this study addresses the broader context of AI's role in shaping the future of work and society. By providing a balanced view that highlights both the potential for innovation and the ethical considerations, the research underscores the necessity for thoughtful, well-regulated AI implementation.

As the real estate industry continues to evolve with the integration of AI, the insights from this study can drive innovation, guide strategic decision-making, and help address the challenges posed by this technological advancement. The findings serve as a practical resource for stakeholders aiming to navigate the complexities of AI adoption, ensuring that the benefits of this technology are harnessed while maintaining high ethical standards and equitable access to housing for all individuals and communities. By fostering a deeper understanding of AI's transformative potential and its implications, this study supports the development of a more efficient, ethical, and forward-thinking real estate industry

## **1.9 Scope and Limitations**

The real estate industry has witnessed a significant integration of artificial intelligence (AI) systems in recent times. While these systems offer numerous benefits, they also present a set of challenges that require careful consideration.

One of the primary concerns is data privacy. AI systems rely heavily on extensive datasets for learning and decision-making, raising concerns about the collection, storage, and ethical use of personal data. Businesses utilizing AI must prioritize robust data privacy and security measures to safeguard users' personal information. Ensuring compliance with data protection regulations and implementing stringent data handling protocols are essential to maintaining user trust and avoiding potential legal issues.

Another challenge is the potential for biases in AI algorithms. Biases in the data used to train these algorithms, whether explicit or implicit, can result in unfair practices and amplify existing disparities. Developers of AI systems must meticulously address potential biases by carefully selecting and examining datasets and continuously monitoring the system's outputs. This involves implementing diverse and representative data samples, conducting regular audits of AI processes, and refining algorithms to enhance fairness and objectivity.

The issue of job displacement due to automation is also a growing concern. While AI enhances processes and efficiency, it can potentially replace jobs, particularly those involving routine tasks. Real estate businesses leveraging AI must be mindful of its potential impact on employment and develop strategies for retraining or upskilling the workforce. Providing employees with opportunities to acquire new skills and adapt to changing job requirements is essential for navigating this transition responsibly.

Furthermore, the integration of AI into real estate practices necessitates a socially responsible approach. Businesses must consider the broader implications of AI adoption, including its impact on employees and the community. Ensuring that the transition to AI is carried out ethically involves not only addressing technical challenges but also fostering a culture of continuous learning and adaptation within the organization.

The scope of this study encompasses the various dimensions of AI integration in the real estate industry, examining both its potential and its challenges. By exploring the benefits and addressing the limitations, the study aims to provide a balanced perspective on AI's role in transforming real estate practices.

Addressing these challenges requires a meticulous and responsible approach that prioritizes data privacy, eliminates potential biases, and mitigates the impact on employment. By doing so, businesses can successfully leverage the benefits of AI while remaining socially responsible and ethical. The responsible adoption of AI will enable the real estate industry to enhance efficiency, innovate processes, and ultimately provide better services to clients, all while maintaining a commitment to ethical practices and societal well-being.

### **1.10 Methodology and Research Approach**

This study presents a thorough analysis of the potential impact of artificial intelligence (AI) on the real estate industry, focusing on the legal aspects of AI integration. The research aims to provide valuable insights for industry professionals and policymakers, aiding strategic decision-making as AI reshapes the real estate sector.

Methodologically, the study employs an extensive literature review and qualitative analysis of case studies. The focus is on understanding the legal implications of AI applications in real estate, particularly in areas such as property transactions, regulatory compliance, data privacy, and intellectual property rights.

The study examines how AI can streamline property transactions and compliance processes, highlighting both the legal opportunities and challenges. It delves into issues of data privacy, considering how AI systems collect, store, and use personal data. This includes exploring the legal frameworks that govern data protection and the measures necessary to ensure compliance with these regulations.

Another key area of investigation is the potential for biases in AI algorithms and their legal implications. Biases in data can lead to discriminatory practices, and this study explores how legal standards can be established to mitigate such risks. Continuous

monitoring and auditing of AI systems are recommended to ensure fairness and transparency.

The study also addresses the potential legal challenges related to job displacement due to AI-driven automation. As AI systems take over more tasks traditionally performed by humans, there are significant implications for employment law and labor rights. The research suggests strategies for mitigating these impacts, such as workforce retraining and upskilling programs.

Additionally, the study considers the intellectual property issues arising from AI-generated content and decisions. It explores who holds the rights to AI-generated property valuations, legal documents, and other outputs, providing guidance on how to navigate these complex legal landscapes.

The findings of the study emphasize the need for robust legal frameworks to govern the integration of AI in real estate. Industry professionals can use these insights to ensure that their use of AI is compliant with legal standards and ethical principles. Policymakers can draw on the research to develop regulations that protect consumers and promote fair practices while fostering innovation.

In summary, this study underscores the importance of addressing legal considerations in the integration of AI into the real estate industry. By focusing on data privacy, algorithmic fairness, regulatory compliance, and intellectual property rights, the research provides a comprehensive legal roadmap for the responsible and ethical adoption of AI technologies. This approach ensures that the benefits of AI can be fully realized while safeguarding the interests of all stakeholders involved.

## Chapter 2

### Evolution and Impact of AI on Due Diligence in Real Estate Investments

#### 2.1 Intersection of AI and Due Diligence in Real Estate Investment

The convergence of artificial intelligence (AI) and due diligence in real estate investment is a crucial area that necessitates thorough exploration from a legal perspective. AI technologies are revolutionizing various sectors, including real estate, and their potential impact on the due diligence process, which is fundamental for making sound investment decisions, cannot be overlooked. This thesis delves into the legal ramifications and practical applications of AI-driven due diligence in real estate investments.

AI has brought about significant changes in the real estate landscape, presenting both opportunities and challenges. One noteworthy impact is the personalized property search enabled by intelligent algorithms. These algorithms comprehend buyer preferences, financial constraints, and various property attributes, providing a tailored experience. They consider factors such as location, amenities, safety, and even sunlight exposure. Notably, AI algorithms learn and refine recommendations over time based on user interactions, making property buying a personalized service.

AI-powered technologies like Virtual Reality (VR) and Augmented Reality (AR) offer immersive property viewings, breaking geographical barriers. These technologies enable detailed property tours from the comfort of one's home. AI contributes to creating 3-D models and enhancing virtual tours by identifying key features and tailoring experiences to buyer preferences. Moreover, AI assists in suggesting property modifications or enhancements, enriching the interactive aspects of AR and VR tours. Integration with chatbots during virtual tours provides comprehensive information on properties, neighborhoods, and financing options, enhancing the property buying experience.

In the operational sphere, AI has significantly reduced the paperwork associated with real estate transactions by automating tasks such as contract review, due diligence checks, and regulatory compliance management. These traditionally manual tasks are now accomplished more efficiently, saving time and costs. The introduction of AI not only



streamlines processes but also reduces the risk of human errors, ensuring a more dependable transactional experience.

For example, contract review, an essential aspect of real estate transactions, involves examining property agreements for potential risks. While this process previously demanded extensive manual review, AI-powered contract analysis tools automate it using natural language processing (NLP) to understand contract language, identify key clauses, and flag potential issues. Due diligence checks, which encompass a thorough review of property records, title documents, and zoning laws, among others, are transformed by AI. AI-powered tools can swiftly sift through documents, highlight pertinent information, and flag potential concerns, enhancing the efficiency of due diligence processes.

In regulatory compliance, AI plays a vital role by automating transaction verification against relevant laws and regulations, ensuring adherence to legal requirements. Additionally, AI aids in document management by automating tasks such as sorting, filing, and retrieving documents through optical character recognition (OCR), further streamlining the transaction process and reducing the likelihood of human error.

From a legal perspective, the integration of AI in due diligence processes raises several important considerations. These include the reliability and accuracy of AI tools, data privacy and security issues, liability for AI-generated errors, and the ethical implications of automated decision-making. Legal professionals must ensure that AI tools comply with existing regulations and standards, and they must be prepared to address new legal challenges that arise as technology evolves.

Regarding customer service, AI has made a significant impact through AI-powered chatbots capable of providing instant responses to customer inquiries. These chatbots enhance customer service by furnishing information on properties, neighborhoods, and financing options, creating a comprehensive and user-friendly property buying experience.

AI represents a transformative force in the real estate industry, promising even more sophisticated tools in the future. Collaborative efforts among legal professionals, financial institutions, and technology providers are essential to navigate the evolving legal

landscape and ensure that AI is leveraged for the benefit of investors and the broader real estate market. The responsible and ethical implementation of AI in real estate due diligence necessitates careful consideration of both the legal and practical implications, and this essay offers a thorough analysis of this innovative approach.

## **2.2 Overview of Due Diligence in Corporate Finance**

Corporate finance is a critical aspect of business operations, facilitating capital acquisition, expansion initiatives, and goal achievement. However, before embarking on any financial transactions, conducting thorough due diligence is imperative. This involves an exhaustive examination of the target company's financial statements, operational efficiency, legal compliance, and overarching business strategy.

During the due diligence process, a team of specialists from various disciplines collaborates closely to assess the target company's management competence, financial stability, market positioning, and potential risks. This comprehensive analysis informs decision-making regarding valuation and potential adjustments to the transaction structure.

In the realm of real estate transactions, due diligence serves the interests of both sellers and buyers. Sellers aim to secure the highest possible sale price while ensuring transaction security, while buyers seek to obtain the property at the most favorable terms while mitigating risks. Negotiating the terms of a transaction requires a delicate balance between competing interests. The extent of seller guarantees may be influenced by the purchase price, while buyers may seek comprehensive assurances to protect their investment. Due diligence plays a pivotal role in identifying, evaluating, and managing risks associated with the property, ensuring transparency and informed decision-making throughout the transaction process.

Ultimately, the objective of due diligence is to provide a comprehensive understanding of the risks and opportunities inherent in the transaction, enabling stakeholders to make

informed decisions that align with their objectives. This careful and thorough investigation is crucial in maintaining the integrity and success of corporate financial transactions, ensuring that both parties can proceed with confidence.

### **2.3 The Evolution of Due Diligence in Real Estate**

Within the real estate industry, due diligence has become a critical component, evolving significantly to address the intricacies of the market. Initially, due diligence involved rudimentary checks on property conditions and legal aspects. However, as real estate transactions grew in complexity, due diligence expanded to encompass diverse facets such as financial viability, legal compliance, environmental impact, and regulatory adherence.

Technological advancements have played a pivotal role in shaping the evolution of due diligence. Innovative tools such as geographic information systems (GIS), drones, virtual reality, and data analytics have enhanced property assessments, making them more efficient and insightful. These innovations empower stakeholders to gain deeper insights into properties, spanning from their physical state to their market potential.

Risk management has emerged as a central focus of due diligence. With the real estate market susceptible to various risks, from regulatory alterations to environmental concerns, meticulous due diligence aids in identifying and mitigating these risks at the outset. It serves as a crucial step in making well-informed investment decisions and safeguarding investments against potential liabilities. Regulatory compliance serves as another pivotal driver of changes in due diligence practices. Real estate transactions must adhere to a plethora of laws and regulations, ranging from zoning codes to environmental safeguards. Compliance ensures the legality of transactions and minimizes the risk of legal entanglements in the future.

Market dynamics exert a profound influence on due diligence practices. In competitive markets, there is pressure to expedite due diligence processes. However, it remains essential to strike a balance between speed and thoroughness to ensure all pertinent factors are duly considered before making decisions. Moreover, there is a growing emphasis on sustainability and social responsibility in real estate. Due diligence now encompasses assessments of energy efficiency, social impact initiatives, and corporate governance practices. Investors and stakeholders increasingly prioritize the broader impact of their investments beyond mere financial returns.

The term "due diligence" originates from US American capital and investor protection law. Due to globalization, it has permeated continental Europe, particularly in Germany, with the English term gaining acceptance in the German language. Conceptually rooted in a legal context, due diligence denotes the legal standard for negligence that could result in contractual or statutory liability. It entails a meticulous examination, analysis, and evaluation of the factual and legal circumstances surrounding the transaction object.

Due to its burgeoning significance in the capital market, due diligence increasingly resembles corporate transactions, irrespective of jurisdiction. This encompasses both direct asset acquisitions such as land, buildings, contracts, leases, receivables (asset deals), and indirect acquisitions like shares in real estate companies or interests in funds, as well as real estate financing or development under joint ventures. The foundation of due diligence processes lies in the information gap between potential transaction parties.

Thus, the essence of a due diligence investigation lies in bridging this gap by establishing rules during due diligence to address discrepancies, unmet expectations, or defects in the transaction target. The terms denoting different forms of due diligence vary as extensively as the transactions themselves. Primarily, the seller's and buyer's interests delineate the starting point of due diligence investigations, leading to a distinction between seller due diligence and buyer due diligence. The seller's due diligence investigation, often dubbed reverse due diligence, pre-sale due diligence, or vendor-side due diligence, serves the seller's objectives. When the aim is to alleviate the potential buyer's examination burden, the term "vendor due diligence" gains prevalence, especially in structured bidding processes. Ultimately, the goal of such seller-initiated due diligence is to foster transparency and trust in the transaction process, thereby facilitating the sale.

## **2.4 AI Use Cases in the Real Estate Industry: Legal Perspectives**

The integration of Artificial Intelligence (AI) has profoundly transformed the real estate industry, streamlining operations, enriching decision-making capabilities, and enhancing customer experiences. However, these advancements also raise significant legal considerations that must be addressed to ensure compliance and ethical implementation.

AI-powered property search platforms have revolutionized the market by leveraging machine learning algorithms to deliver highly personalized property recommendations. These platforms utilize vast amounts of data, including property listings, user preferences, and location-based insights, expediting the search process and ensuring customer satisfaction. From a legal perspective, the use of AI in property searches brings up critical issues related to data privacy and security. Compliance with regulations such as the General Data Protection Regulation (GDPR) is essential, as these platforms collect and process significant amounts of personal data. Furthermore, ensuring the transparency and fairness of AI algorithms is crucial to avoid discrimination and bias in property recommendations.

Predictive analytics has become a pivotal tool in real estate, offering sophisticated solutions for property valuation by analyzing historical sales data, market trends, and economic indicators. This approach enables stakeholders to make well-informed decisions regarding property investments, market identification, and pricing strategies. However, the accuracy and reliability of AI-generated valuations can be legally contentious. It is imperative that AI tools adhere to industry standards and regulatory requirements, and that potential liabilities for inaccurate predictions are carefully considered, especially when investors rely heavily on AI-driven insights.

The use of AI-powered virtual assistants and chatbots marks a new era of convenience and efficiency in real estate. These systems employ Natural Language Processing (NLP) to understand user queries, facilitating conversational searches and tailored recommendations. They provide detailed information about properties, market trends, and comparable properties, aiding in informed decision-making. Legally, the deployment of AI chatbots must comply with consumer protection laws to ensure that the information

provided is accurate and not misleading. Additionally, data security and confidentiality of user interactions are paramount, necessitating measures to prevent unauthorized access and ensure compliance with privacy regulations.

In property management, AI technologies automate tasks, reducing the burden on property managers and minimizing human errors. AI-driven platforms streamline rent collection, maintenance scheduling, tenant screening, and lease administration, optimizing various management facets. The automation of these tasks raises legal concerns about the accuracy and legality of AI-generated actions. Ensuring compliance with housing laws, tenant rights, and anti-discrimination regulations is crucial to prevent legal disputes and uphold ethical standards.

AI has also transformed real estate investments by reshaping portfolio optimization processes and enhancing decision-making capabilities. AI's predictive analytics forecast property values, rental income, and market fluctuations, enabling investors to make informed decisions. This integration involves significant legal considerations related to investment regulations and fiduciary duties. Investors must ensure that AI-driven strategies comply with financial regulations and ethical standards, and that the legal responsibility for AI-generated investment advice is clearly defined to mitigate potential liabilities.

Lastly, AI has revolutionized lead generation in real estate by automating and optimizing the process. AI algorithms identify potential leads based on diverse factors and predict the likelihood of conversion, allowing agents to prioritize high-potential leads. However, the use of AI in lead generation must comply with marketing and data protection laws to avoid deceptive practices and violations of consumer rights. Transparency in how leads are generated and managed by AI is essential to maintain trust and legal compliance.

While AI integration in the real estate industry offers numerous opportunities for efficiency and innovation, it also necessitates careful consideration of the legal landscape. Ensuring compliance with data privacy laws, preventing discrimination and bias, maintaining accuracy and transparency, and addressing liability issues are critical to leveraging AI responsibly and ethically in real estate. This chapter provides a

comprehensive analysis of these legal implications, guiding stakeholders in navigating the evolving terrain of AI-driven real estate practices.

## **2.5 The Impact of AI on the Real Estate Sector: Opportunities and Challenges**

Artificial Intelligence (AI) has garnered significant attention across multiple industries, including the real estate market. AI is projected to dramatically transform the real estate market, which is anticipated to attain a valuation of US \$1335.89 billion by 2029, with a Compound Annual Growth Rate (CAGR) of 35% during the forecast period. This growth underscores AI's potential to redefine the real estate sector, ushering in a new era of innovation and efficiency. AI-powered solutions are revolutionizing the industry by simplifying and expediting complex processes, ultimately boosting work efficiency across various roles, including sellers, brokers, asset managers, and investors.

Automation and data-driven insights empower real estate professionals to navigate the complexities of their field with greater ease and productivity. One of the significant advantages of AI in real estate is the ability to analyze vast amounts of data quickly, allowing for more accurate predictions of property values and market trends. This capability aids real estate professionals in making better-informed decisions. Additionally, AI-powered chatbots and virtual assistants provide quick and efficient customer service, freeing human agents to handle more complex tasks. The efficiency gains catalyzed by AI hold the promise of significant reductions in costs associated with real estate transactions, as routine tasks are automated, and workflows streamlined.

The transformative capabilities of AI simplify processes, provide data-driven insights, and reduce costs, contributing to the industry's growth and development. The integration of AI-powered solutions in the real estate market represents a crucial step toward innovation and enhanced efficiency.

The real estate industry has traditionally been a significant pillar of the global economy, acting as a crucial intermediary between property buyers and sellers and facilitating the acquisition and management of residential, commercial, or investment properties. However, the process of buying, selling, and managing real estate has long been fraught with challenges, relying heavily on human expertise and effort. In recent years, AI



integration has significantly impacted the real estate sector, reshaping the way properties are searched, evaluated, and managed.

AI-powered tools and systems have transformed how real estate agents and property managers conduct business, automating many of the manual processes involved in property transactions and delivering more precise and efficient solutions for property buyers and sellers. This integration has led to the creation of intelligent real estate systems that facilitate the analysis of vast amounts of data, enabling more informed decision-making by investors and property owners.

Challenges faced by the traditional real estate industry include manual processes, limited data analysis, time-consuming property searches, lack of personalization, inefficient property management, communication gaps, and dependence on local expertise. Traditional real estate systems have served as the backbone of the industry for decades, providing the framework for property transactions, marketing, and management. These systems are often manual and paper-based, and advancements in technology have highlighted their limitations, necessitating innovative solutions.

An understanding of the workings of traditional real estate systems is critical to appreciating the potential benefits of AI integration. Historically, real estate transactions entailed significant manual work and paperwork. From filling out property listings to managing contracts and documentation, real estate professionals dedicated a significant amount of time to administrative tasks, leading to inefficiencies and delays. In today's fast-paced world, such inefficiencies can result in missed opportunities and lost revenue.

Traditional systems lacked advanced data analysis capabilities, which posed a challenge for real estate professionals. Limited data analysis led to underutilization of valuable insights from large datasets, resulting in suboptimal decision-making. Prospective buyers faced the obstacle of physically visiting multiple properties or manually browsing through listings in their search for a suitable property. Property valuations were often subjective and conducted by human appraisers, leading to variations in property values. These subjective and time-consuming processes hindered efficiency in the real estate market. The lack of personalization in property searches and recommendations further prolonged the property search process and led to dissatisfaction among buyers and investors.

Property management also involved managing several activities, such as tenant communication, rent collection, and maintenance, which were labor-intensive and costly.

The real estate industry has been plagued by communication gaps and a lack of transparency among its various stakeholders, including buyers, sellers, agents, and property management companies. Fragmented data systems that are not properly integrated often cause these issues, leading to delays and misunderstandings in property transactions. Furthermore, traditional real estate systems have long relied on local expertise and knowledge to manage transactions, potentially limiting broader market insights and growth opportunities for investors and businesses.

AI integration offers a pathway to address these challenges and unleash the market's potential. By leveraging AI-powered systems, the industry can streamline processes, enhance data analysis capabilities, provide customized experiences, and improve overall efficiency. Real estate professionals must comprehend the limitations of traditional systems to fully understand the value of AI and embrace the opportunities for innovation and growth that it presents. As AI continues to evolve, the real estate industry stands to become more integrated, transparent, and accessible than ever before.

AI addresses the shortcomings of legacy real estate systems by streamlining transactions, minimizing errors, enhancing data analysis, improving property search efficiency and personalization, optimizing property management, fostering communication and transparency, and expanding market insights. AI integration redefines traditional real estate systems, offering unmatched possibilities for growth and innovation. By embracing AI technology, the real estate industry can overcome historical challenges and unlock new potential for development and success.

## **2.6 Legal Implications of AI-Driven Due Diligence in Real Estate Investments**

Artificial Intelligence (AI) refers to the capacity of machines to perform tasks requiring human-like intelligence, distinct from natural human or animal intelligence. Although AI development spans over five decades, its widespread adoption in businesses has surged only in the past decade. This rapid expansion introduces significant legal implications, particularly in the realm of AI-driven due diligence in real estate investments.

At the core of AI are algorithms, broadly classified into standard machine learning algorithms and deep learning algorithms. Standard machine learning algorithms categorize data or estimate relationships using numerical methods, while deep learning algorithms leverage neural networks to learn from past errors. The rapid expansion of AI has resulted in a lack of substantial experience in working with or programming AI for most businesses and employees. Consequently, there is a growing reliance on specialized firms that offer AI platform-based services and products.

Corporate transactions in the AI market, including mergers and acquisitions, initial public offerings, and venture capital investments, have surged in recent years, with transactions exceeding £25 billion in 2022, marking a nearly 500% growth over five years. This growth underscores the confidence among companies and investors in AI's potential to enhance revenues, profitability, service and product offerings, and cost-cutting measures.

However, the rapid growth of AI presents unique challenges for legal systems worldwide, as evolving technologies introduce newer risks and complexities. AI presents a unique challenge for regulatory frameworks, as the market risks are not fully understood, and legal clarity is often lacking. Stakeholders involved in acquiring or investing in AI businesses must navigate these legal implications and associated risks diligently.

Legal due diligence serves a dual purpose: facilitating commercial and entrepreneurial decisions while also mitigating liability risks for all parties involved. Firstly, it ensures the legal validity and security of findings, forming the foundation for decisive commercial and entrepreneurial choices. Given that every facet of life, be it commercial, technical, cultural, or sociological, is underpinned by legal regulations, legal due diligence is fundamental to any comprehensive investigation. Secondly, legal due diligence aims to limit the liability of both acting individuals and contracting parties.

For sellers, this is achieved through a legal vendor due diligence investigation, enabling them to fulfill pre-contractual obligations to inform the buyer about essential circumstances. Conversely, buyers employ legal due diligence to safeguard against forfeiting rights due to ignorance of unfavorable circumstances, which could be deemed as gross negligence on their part. In the Anglo-Saxon legal tradition, the principle of "caveat emptor" (Latin for "let the buyer beware") places the onus on the buyer to assess

the purchase item. However, this principle holds less sway in continental European jurisdictions, where statutory warranty rights provide a more balanced framework.

In real estate transactions where, statutory regulations may be partially or wholly excluded, pre-sale due diligence assumes significance. It protects sellers from allegations of fraudulent concealment and prevents buyers from facing accusations of neglecting to identify adverse circumstances due to gross negligence. Legal due diligence not only facilitates informed decision-making but also safeguards the interests of all parties involved in transactions, ensuring transparency, fairness, and legal compliance throughout the process. By ensuring the legal validity and security of findings, legal due diligence forms the basis for accurate commercial and entrepreneurial decisions.

Key legal considerations in AI-driven due diligence include:

### ***Intellectual Property***

Ensuring the protection of intellectual property (IP) is paramount in assessing the value of AI enterprises for both investors and purchasers. Effective utilization of AI systems relies on access to a variety of data sources, whether from the public domain or through agreements with other entities. The resulting output generated by algorithms processing this data constitutes the core of the AI system. Algorithms employed within AI enterprises may be eligible for trade secret protection if kept confidential. Purchasers must verify the existence of such protection and ensure appropriate measures are taken to uphold ownership of IP rights.

Conversely, sellers should provide details on the disclosure of confidential information within or by the Target and confirm measures are in place to maintain the confidentiality of trade secrets. Information pertaining to the ownership of AI output by the Target through contracts or local IP laws should be disclosed. Additionally, it is vital to ascertain the origin of the algorithm, whether from third-party or open-source software.

Ownership arrangements regarding intellectual property rights and AI systems within the Seller's group or vice versa, and whether such arrangements persist post-acquisition, should be identified. The buyer should inquire about any disputes or challenges regarding

AI intellectual property owned or used by the Target, including issues of subsistence, ownership, and validity of intellectual property rights. Information on suspected or alleged infringement of intellectual property used or owned by the Target by third parties, as well as vice versa, should also be requested. Furthermore, it is crucial to determine whether any intellectual property has been registered concerning the AI system. Questions regarding the patentability of AI should be raised, including the Target's approach to patent filing and maintenance for innovative or technical AI utilized in the business.

### ***Data Protection***

Data protection regulations, particularly the EU General Data Protection Regulation (GDPR) 2016/679, are pivotal in governing the utilization of personal data within AI systems. Understanding whether the Target functions as a data controller, processor, or both is essential, as it dictates its responsibilities towards data subjects or controllers. Scrutinizing the transparency of the Target's data processing, including privacy notices and impact assessment systems, is crucial. Evaluation of the data source for AI input, its usage rights, and compliance with data protection legislation are paramount.

Recent legal precedents highlight the significance of adhering to data protection principles, especially concerning web scraping of facial images. Ensuring that all data used by the Target is stored securely and that the AI system adheres to privacy-by-design principles is imperative. Buyers must ensure lawful, fair, and transparent processing of personal data and confirm compliance with data protection laws. Upholding the confidentiality, integrity, and lawful use of personal data is indispensable to prevent misuse or unauthorized access.

### ***Information Technology***

The buyer's due diligence process involves thorough inquiries into the Target's information technology infrastructure, focusing on AI hardware, software, technology, and networks. Assurance regarding the reliability and functionality of the AI system is sought from the seller, emphasizing the absence of technical issues. Evaluation of current AI system utilization ensures legal compliance, particularly with data protection

regulations, and identifies associated legal and reputational risks. Understanding the types of data used helps detect and prevent biases in AI outputs.

Arrangements for disaster recovery, facility management, cloud computing, outsourcing, and ongoing support are examined, along with fee structures and service levels. Cybersecurity track record scrutiny, including successful security breaches, is essential, with safeguards against breaches implemented for data privacy and protection. Access to relevant contracts with third-party providers hosting AI systems is requested, and details of open-source code and license agreements analyzed.

Attention is paid to whether the Target has access to source code for licensed AI components, ensuring compliance with license terms and conditions to avoid unlicensed AI use. Sellers must disclose any circumstances affecting existing licenses, and the scope of rights granted for AI licensed to third parties must be verified for legal compliance.

The exponential growth of AI demands a thorough understanding of its legal and regulatory landscape. As the market continues to evolve rapidly, businesses and investors must stay abreast of emerging risks and challenges to capitalize on AI's transformative potential while mitigating associated risks effectively. Legal due diligence is critical in facilitating informed decision-making, protecting interests, and ensuring compliance with legal requirements in AI-driven real estate investments.

### **2.6.1 Regulatory Framework for AI in Real Estate Investments**

The regulation of artificial intelligence (AI) has become a significant area of interest and concern for governments, organizations, and individuals worldwide. Recent years have witnessed a surge in the number of proposed and developing frameworks for AI regulation, covering a range of issues, including privacy, security, safety, transparency, human oversight, and fairness. This section explores the legal and regulatory frameworks pertinent to AI-driven due diligence in real estate investments.

AI's integration into the real estate sector introduces complex legal challenges, necessitating robust regulatory frameworks to ensure ethical and compliant use. Various

countries, including China, the UK, and Israel, have implemented AI-related policies and regulations. Additionally, numerous international cooperation initiatives, such as the Global Partnership on AI (GPAI), the United Nations, and the Organisation for Economic Co-operation and Development (OECD), have been formed to address these issues.

A notable trend in the regulatory landscape is the focus on human-centric AI values, including privacy, security, safety, transparency, human oversight, and fairness. There is also an increasing demand for corporate operational AI controls, self- and third-party design and impact assessments, data quality controls and governance, and the elimination of malicious and biased AI use.

The U.S. has released a non-binding Blueprint for an AI Bill of Rights, outlining principles to safeguard the rights of the public in the age of AI. These principles include safe and effective systems, protections against algorithmic discrimination, data privacy, notice and explanation, and human alternatives and fallback options. This framework aims to address the potential for AI algorithms to amplify discrimination in access to essential goods, services, and rights, including housing, healthcare, and employment.

Similarly, the European Union (EU) has proposed a comprehensive AI regulation, aiming to be the first broad-based AI law with extraterritorial reach. This regulation categorizes AI systems into forbidden uses, high-risk AI, and limited-risk AI. High-risk AI would be subject to conformity assessments and required controls, while limited-risk AI would have transparency requirements. Violators could face substantial fines, in addition to General Data Protection Regulation (GDPR) penalties. This regulatory approach underscores the EU's commitment to addressing AI's impact on various sectors, including real estate.

In real estate, AI-driven due diligence encompasses several critical legal considerations. AI systems in real estate transactions handle vast amounts of personal and sensitive data. Compliance with data protection regulations such as the GDPR is crucial. These regulations mandate transparency in data processing, the necessity for impact assessments, and strict data security measures. Ensuring that AI systems adhere to privacy-by-design principles and lawful data processing is essential to prevent misuse and unauthorized access to personal data.

The use of AI in real estate involves significant intellectual property (IP) considerations. AI algorithms, data inputs, and generated outputs may be subject to IP protections such as trade secrets, patents, and copyrights. Buyers and sellers must ensure that AI technologies and data used in real estate transactions are legally protected and that appropriate measures are in place to uphold ownership and usage rights. Disputes over IP ownership, especially involving AI-generated content, must be carefully navigated to avoid legal conflicts.

Moreover, AI systems must operate transparently and fairly, avoiding biases that could result in discrimination. Regulatory frameworks increasingly require AI systems to be explainable, ensuring that decisions made by AI can be understood and scrutinized by humans. In real estate, this is particularly important in areas like property valuations, loan approvals, and tenant screenings, where biased algorithms could lead to unfair outcomes. Compliance with anti-discrimination laws and regular audits of AI systems are necessary to maintain fairness and transparency.

Real estate professionals using AI must navigate a complex web of regulations to ensure compliance. This includes adherence to housing laws, tenant rights, anti-discrimination regulations, and data protection laws. Legal due diligence in AI-driven real estate transactions involves assessing the compliance of AI tools with existing laws and identifying potential liabilities. This also extends to ensuring that AI systems do not inadvertently violate consumer protection laws or other regulatory requirements.

The ethical deployment of AI in real estate requires balancing automation with human oversight. AI systems should enhance decision-making processes without completely replacing human judgment. Ensuring that there is always a human element in critical decisions helps mitigate risks associated with AI errors and biases. Ethical guidelines and oversight mechanisms should be established to govern the use of AI in real estate, ensuring responsible and accountable use.

AI-driven real estate transactions often involve cross-border elements, raising jurisdictional challenges. Different countries have varying regulations regarding data protection, IP rights, and AI use. Real estate professionals must navigate these differences and ensure compliance with relevant laws in all jurisdictions involved in a transaction.



This requires a thorough understanding of international legal frameworks and potential conflicts of law.

The rapid adoption of AI in real estate necessitates a comprehensive understanding of its legal and regulatory landscape. By addressing these legal considerations, stakeholders can leverage AI's transformative potential while ensuring compliance, fairness, and ethical use. The evolving standards and increasing enforcement highlight the importance of staying informed and prepared for the legal challenges posed by AI in real estate investments.

## **2.7 The Impact of AI-Powered Contract Analysis Tools on Contract Review in Real Estate Investments**

Contracts are the backbone of real estate transactions, serving as legal documents that define the terms and conditions of agreements and ensuring that all parties uphold their responsibilities. The review and maintenance of these contracts, however, can be complex and time-consuming, especially when dealing with a large volume of agreements. AI-powered contract analysis tools have emerged as a transformative solution, streamlining the process and enhancing efficiency and accuracy, with significant implications for the real estate sector from a legal perspective.

AI-powered contract analysis tools utilize machine learning and natural language processing (NLP) to review, analyze, and manage contracts swiftly and accurately. These tools can extract key information, identify potential risks, and ensure compliance with relevant laws and regulations, significantly impacting the legal landscape of real estate transactions.

The traditional contract review process in real estate involves extensive manual examination of documents to identify critical clauses, potential risks, and compliance issues. This process is labor-intensive and prone to human error. AI-powered tools can automate much of this work, quickly scanning and analyzing contracts to highlight essential elements and flag potential problems. For example, AI can identify key clauses such as termination provisions, indemnities, warranties, and liabilities, which are crucial

in real estate contracts. It can also detect inconsistencies and ambiguities, suggesting revisions to improve clarity and reduce the likelihood of disputes.

One of the most significant advantages of AI in contract review is its ability to handle large volumes of contracts efficiently. In the real estate industry, where transactions often involve numerous documents and complex agreements, this capability is invaluable. AI tools can process and analyze contracts much faster than human reviewers, providing timely insights that facilitate quicker decision-making and transaction closures.

Moreover, AI-powered contract analysis tools enhance the management of legal agreements by organizing and categorizing contracts based on various criteria, such as type, date, and parties involved. This organization facilitates easy access and retrieval of specific documents, improving overall contract management. Additionally, these tools can monitor contract performance and compliance, ensuring that all parties adhere to their obligations and identifying any deviations promptly. This proactive approach helps mitigate risks and prevent potential legal issues.

From a legal perspective, the use of AI in contract review introduces several important considerations. Data privacy and security are paramount, as AI tools handle sensitive and confidential information. Compliance with data protection regulations, such as the General Data Protection Regulation (GDPR), is essential to safeguard personal and business data. Ensuring that AI tools are designed with privacy by design principles and that they process data lawfully is crucial to maintaining trust and legal compliance.

The transparency and explainability of AI algorithms are also critical. In the legal domain, it is important that the decisions and recommendations made by AI tools can be understood and scrutinized by humans. This transparency helps ensure that AI does not introduce bias or discrimination into the contract review process. Regular audits and assessments of AI tools can help maintain their accuracy and fairness, ensuring they comply with legal standards and best practices.

Another legal consideration is the potential liability associated with AI-generated recommendations. If an AI tool suggests a contract revision that leads to a dispute or legal issue, determining responsibility can be complex. It is essential for real estate firms to

establish clear guidelines and protocols for using AI in contract review, including human oversight and intervention when necessary. This helps ensure that AI is used as a tool to support, rather than replace, human judgment and expertise.

The integration of AI in contract review also has implications for the roles and responsibilities of legal professionals in the real estate industry. While AI can handle many routine tasks, legal professionals are still needed to provide strategic insights, negotiate complex agreements, and address nuanced legal issues. AI tools can augment their capabilities, allowing them to focus on higher-value activities and improve overall efficiency.

Ultimately, AI-powered contract analysis tools are revolutionizing the contract review process in real estate investments. They offer significant benefits in terms of efficiency, accuracy, and risk management, while also introducing new legal considerations that must be carefully managed. By leveraging AI responsibly and ensuring compliance with legal and ethical standards, real estate firms can enhance their contract management processes and gain a competitive edge in the market.

## **2.8 The Impact of AI-Powered Contract Analysis Tools on Legal Processes in Real Estate Investments**

The real estate industry, characterized by its complex legal frameworks and voluminous documentation, has significantly benefited from the advent of Artificial Intelligence (AI) tools, particularly in the realm of contract analysis and management. These AI-powered software programs assist legal practitioners in streamlining various processes, from contract review to document management, offering enhanced efficiency, accuracy, and compliance. Below are several AI-powered tools that are particularly relevant to the legal aspects of real estate.

### **Kira**

- **Functionality:** Kira is a patented AI technology that extracts specific documents from case files and records. It is designed to identify and extract clauses from contracts, assisting in contract review.

- **Application in Real Estate:** Kira helps real estate firms quickly identify key clauses and potential risks in property agreements, leases, and other legal documents, thereby enhancing the efficiency and accuracy of legal reviews.

## **Hyperlex**

- **Functionality:** Hyperlex manages contracts through all phases, from creation to negotiation to setting reminders for deadlines. It analyzes every clause and language of a contract to mitigate potential future conflicts.
- **Application in Real Estate:** Hyperlex accelerates the contract management process, ensuring compliance with contractual terms. This is crucial for real estate transactions, where timely and accurate contract management is essential.

## **Evisort**

- **Functionality:** Evisort uses advanced AI to automate data search and extract data from contracts, simplifying data collection and improving accountability in workflow. It helps keep track of contract renewals and approvals, featuring auto-alerts for key dates.
- **Application in Real Estate:** Evisort enhances operational efficiency by ensuring critical dates and terms are not missed in real estate contracts, preventing unwanted costs or missed opportunities.

## **Luminance**

- **Functionality:** Founded by the University of Cambridge, Luminance functions as a document review software that maintains the client's legal database. It accelerates document reviews, highlights key clauses, and alerts users to potentially conflicting terms.
- **Application in Real Estate:** Luminance simplifies legal analysis and reduces the time spent on contract review, making it invaluable for real estate legal teams who need to ensure thorough and accurate contract analysis.

## **ROSS**

- **Functionality:** ROSS is based on question-based research and serves as a document analyzer, searching for critical treatments in legal documents. It assists legal practitioners in their research and analysis.
- **Application in Real Estate:** ROSS helps streamline legal research and document analysis tasks in real estate, improving efficiency in reviewing property laws, zoning regulations, and other legal considerations.

### **Lex Machina**

- **Functionality:** Lex Machina analyzes the behavior and case records of judges, opposing counsel, and parties to predict their behavior and frame strategies. It offers a case list analyzer and a motion metric report feature.
- **Application in Real Estate:** Understanding the likely outcomes of legal motions and cases can significantly inform strategic decision-making for real estate firms, especially in litigation involving property disputes or zoning issues.

### **LawGeex**

- **Functionality:** LawGeex is an automated contract review platform that offers suggestions and identifies missing clauses in legal documents. The software reviews contracts according to predefined guidelines.
- **Application in Real Estate:** LawGeex speeds up the contract review process by identifying potential issues and suggesting revisions, allowing legal professionals in real estate to focus on more complex tasks.

### **Everlaw**

- **Functionality:** Everlaw is a cloud-based e-discovery platform that provides end-to-end support, including setting narratives, analyzing testimony, and organizing arguments. It can translate documents into over 109 languages.

- **Application in Real Estate:** Everlaw is valuable for real estate professionals dealing with cross-border transactions, offering comprehensive legal analysis and document translation capabilities to ensure compliance and efficiency.

The application of AI in real estate extends beyond contract analysis to various operational aspects. AI contracts can streamline processes in supply chain management by facilitating the tracking and verification of goods movement, ensuring compliance with terms and transparency in development projects. In finance and banking, AI automates loan agreements and cross-border payments, reducing processing time and errors in real estate financing. Smart contracts simplify property transactions, rental agreements, and property management tasks, reducing paperwork and increasing efficiency. AI also manages intellectual property related to real estate marketing and branding and assists in managing healthcare facilities within real estate developments.

### **2.8.1 Regulatory Framework and Best Practices**

To fully harness the potential of AI in contract analysis and management, a regulatory sandbox environment should be established to test innovative AI contract solutions. Collaboration between legal professionals, technology experts, and policymakers is essential to develop best practices for AI contracts. Continuous monitoring and evaluation of AI contracts can help identify gaps and enable timely adjustments to the legal framework. Implementing strong data protection laws and establishing certification and accreditation programs for AI systems and providers will build trust and reliability in the use of AI for contract-related activities.

By leveraging AI responsibly and ensuring compliance with legal and ethical standards, real estate firms can enhance their contract management processes and gain a competitive edge in the market. The integration of AI tools in the legal industry, particularly in real estate, holds vast potential for improving efficiency, accuracy, and overall effectiveness in managing complex legal agreements.

## **2.9. Disadvantages of AI in Real Estate Contract Analysis**

The utilization of AI in contract analysis has been expanding rapidly and holds the potential to revolutionize various industries, including real estate. AI-powered tools offer numerous benefits, such as enhanced efficiency, reduced errors, and improved transparency in managing contracts. However, the implementation of AI in contract analysis also carries certain risks and disadvantages that need careful consideration.

AI contracts streamline processes in supply chain management, finance, banking, and real estate, among other sectors. For example, in real estate, AI contracts can automate property transactions, rental agreements, and property management tasks, thereby reducing paperwork and increasing efficiency. They also ensure compliance with agreed-upon terms, preventing fraudulent activities and strengthening trust between parties involved. Despite these advantages, there are significant challenges and risks associated with AI-powered contract analysis tools.

One primary concern is the potential for communication gaps between parties. AI contracts, while efficient, can sometimes lack the nuance and understanding that human interaction provides. This can lead to misinterpretations or failures in agreements, as AI may not fully capture the intent or specific conditions desired by the parties involved. Ensuring that AI tools are transparent and that their decision-making processes are easily understandable to humans is crucial to mitigate this risk.

Another significant risk is the potential for cyber-attacks and data breaches. AI contracts rely heavily on digital platforms and data storage, making them vulnerable to cyber-attacks. Malicious actors can exploit vulnerabilities in AI systems to manipulate contract terms, access sensitive information, or disrupt the execution of contracts. Robust cybersecurity measures and data protection laws are essential to safeguard the integrity and security of AI-driven contract management systems.

The risk of malpractice and errors is also a concern. Although AI tools are designed to reduce errors, they are not infallible. There is a possibility of AI algorithms making incorrect recommendations or decisions due to biases in the data or flaws in the algorithm

design. This can lead to disputes and legal complications, particularly if the AI-driven recommendations are relied upon without sufficient human oversight.

Furthermore, the reliance on AI tools may lead to a reduced need for human legal professionals, potentially impacting employment in the legal sector. While AI can handle routine tasks, the expertise and judgment of human lawyers are still crucial for complex legal issues, negotiations, and strategic decision-making. Balancing the use of AI with human oversight is essential to maintain the quality and reliability of legal services.

To address these challenges, it is crucial to implement robust data protection laws and establish certification and accreditation programs for AI systems and providers. This will help build trust and reliability in the use of AI for contract-related activities. Collaboration between legal professionals, technology experts, and policymakers should be promoted to develop best practices for AI contracts. Continuous monitoring and evaluation of AI contracts are necessary to identify any gaps or challenges and enable timely adjustments to the legal framework.

Establishing a regulatory sandbox environment can facilitate the testing of innovative AI contract solutions and promote the development of effective regulatory frameworks. This approach allows for the controlled experimentation of new technologies while ensuring compliance with existing legal standards.

The integration of AI-powered contract analysis tools in the real estate sector offers significant potential to improve efficiency, accuracy, and transparency. However, it is essential to carefully consider the potential risks and implement appropriate measures to ensure that the use of AI is safe, fair, and beneficial for all parties involved. By leveraging AI responsibly and ensuring compliance with legal and ethical standards, the real estate industry can enhance its contract management processes and achieve better outcomes for stakeholders.



## Chapter 3

### Opportunities, Risks, and Regulatory Landscape of AI in Real Estate

#### 3.1 Enhancing Real Estate Due Diligence through Artificial Intelligence: Opportunities and Risks

In recent years, the advancement of modern technologies has given independent value to data from unconventional sources in the real estate sector. This data can be classified into two distinct categories, often confused with each other: big data and alternative data.

Big data refers to a vast set of structured, semi-structured, and unstructured data that require high computational capacities and innovative algorithms to be identified, stored, and analyzed. Big data are usually described by the four 'Vs': volume, variety, velocity, and value. Over time, additional characteristics have emerged, such as veracity, which relates to accuracy, source reliability, and data integrity (Piva, 2019).

Alternative data, on the other hand, refers to novel, unstructured, and heterogeneous data. Unlike big data, these data do not necessarily require advanced technologies for their analysis, as they are not always of such a size that new processing methodologies are indispensable (Onukwugha, 2016).

In the real estate industry, big data and alternative data are progressively complementing (and in some cases replacing) traditional, structured data that form the basis of conventional investment strategies, such as fundamental analysis and quantitative strategies. Traditional data is now considered a commodity accessible to all investors; in contrast, big data and alternative data offer a new informational advantage capable of generating alpha.

The application of AI and machine learning to extract information and improve decision-making in real estate portfolio management can have positive effects on the efficiency of operational workflows, performance, risk management, and client relationships (Blackrock, 2019). Early evidence from the real estate investment sector shows a significant impact on the performance of funds claiming to be 'AI-powered', confirming managers' expectations of new technologies, as revealed by numerous surveys published in recent years. Efficiency gains could also be passed on to investors through reduced management fees.

Unlike traditional textual analysis techniques, artificial intelligence makes it possible to automatically identify the factors with the greatest predictive power on property returns, using variables related to the macroeconomic and corporate environment. AI models can be effectively trained not only on historical data but also on forward-looking data, such as analysts' buy or sell recommendations.

In the investment process, the results of data analysis can be integrated into the portfolio optimization process to determine the weights of the component assets, considering the alpha value and the performance objectives of the managers (e.g., replicating a benchmark or maximizing the Sharpe ratio).

The use of big data and artificial intelligence systems is also beneficial in the pre-investment stages, back-office operations, investment administration, and marketing and distribution of real estate investment products. These activities mainly benefit from improved customer segmentation, obtained through a vast array of information on individual preferences and choices (gathered, for instance, from social media), and from the design of distribution models that align with the characteristics of each segment, identifying cross-selling opportunities.

Risk management also benefits greatly from the application of artificial intelligence systems, especially in relation to market and credit risk. AI can improve market risk modeling by using qualitative information extracted from textual sources or images (such as satellite images), allowing more accurate estimates of financial or economic variables at the aggregate and firm level than traditional data. AI techniques that have seen increasing use in recent years, complementing or replacing traditional approaches, include multivariate discriminant analysis and logit and probit models (Financial Stability Board, 2017).

In general, it seems that the value generated by strategies based on big data and alternative data is set to grow, offsetting the costs of developing and using artificial intelligence systems. A crucial decision concerns the way new technologies are acquired, i.e., the degree to which activities are outsourced.

For example, for the collection, storage, and analysis of data, the operator may opt to operate in-house or turn to external providers. During the collection phase, data may be provided by specialized data providers, such as BigTech companies. Regarding data storage, the operator may decide to use its own IT platform or rely on an external provider

via cloud computing. The critical data-cleaning phase can also be handled using an external database.

Total outsourcing has the advantage of avoiding investment in infrastructure and expertise, but the downside is the lack of exclusivity in the analyses and projects acquired. In contrast, total internalization requires considerable investment in research and the acquisition of technology and human resources but offers more control over data and analyses (OECD, 2015).

Intermediate solutions of partial outsourcing allow for a compromise, allowing the purchase of data together with in-house analysis. The development of proprietary models provides a competitive advantage, which is often only available to large players in the industry. However, this could lead to greater industry concentration, at least until outsourcing becomes a more widespread practice.

This development could entail risks related to the limited availability of AI model providers, leading to imitative behavior by managers and a potential increase in systemic risks and volatility during times of market turbulence (BaFin, 2018).

The use of AI systems is associated with a critical issue known as the ‘lack of interpretability’ of some models, which refers to the difficulty of explaining results based on the underlying inputs. Deep neural networks are inherently complex and therefore opaque, producing results that are difficult to interpret. In contrast, classical machine learning algorithms are generally interpretable, such as linear and logistic regressions and decision trees.

The increasing demand for comprehensible results from regulators and the market is driving many operators to work on increasing the interpretability of the models used, even by incorporating explanations into the AI system itself. This solution, however, is not always possible when transparency conflicts with intellectual property or the technology itself, as in the case of neural networks.

The absence of interpretability can have concrete consequences, such as financial losses for certain categories of operators, offset by the benefits of using the AI model, or adverse effects that cannot be mitigated, such as errors in determining an individual's creditworthiness. Moreover, the lack of interpretability, together with the widespread use of outsourcing to acquire models developed by a few external providers, may accentuate

herd behavior and pro-cyclical behavior, generating a systemic impact (Nourani et al., 2020).

The above-mentioned risks could justify the introduction of a requirement for algorithms to be interpretable, especially in highly regulated sectors such as banking and insurance. In some regulatory contexts, there has been a focus on the risks that a specific model poses to its user and the possible mitigation of these risks through a varying level of interpretability under different circumstances.

The trend towards the use of similar data and patterns could also increase the risk of cybersecurity breaches, as it becomes easier for attackers to launch cyber-attacks against actors that follow similar modes of action. Furthermore, if algorithms are used that mimic the strategies of other actors, a cyber-attack on one of these could cascade to compromise any related systems, generating systemic impacts (ACPR, 2022).

It might be useful to reflect on the overall impact of adopting artificial intelligence systems in real estate portfolio management. Since these systems use databases with heterogeneous content, perform data selection for use in investment processes (data cleaning), and apply self-educating and self-constituting methodologies and algorithms, it is possible that relatively similar initial conditions for different intermediaries could lead to significantly different output decisions and investment choices.

At the aggregate level, different investment/disinvestment signals may influence price formation mechanisms and have random impacts on markets, possibly reducing volatility and complicating the interpretation of market movements. However, the heterogeneity of individual behavior could be limited in an environment where there is extensive outsourcing, where a limited range of AI techniques, offered by relatively few providers, could unify and standardize the collective action of various market participants (CONSOB, 2022).

There may thus be a double trade-off between originality of action and likelihood of shock diffusion, associated with the development of in-house expertise and outsourcing, respectively.

In such a context, not only is competitive advantage—understood as the ability to process information quickly, enabling anticipation of competitors' actions—important, but also information advantage, understood as the way in which information is processed correctly, based on the robustness and reliability of the systems adopted (Walch, 2015),

becomes more significant. This dual advantage is particularly crucial in AI-driven due diligence for real estate investments, where timely and accurate information processing can lead to more informed investment decisions and risk assessments.

The integration of artificial intelligence within real estate investment firms inevitably brings benefits, but also structural changes that require in-depth analysis in the light of business economic theory. Some of the impacts that AI has had and will continue to have on business operations need to be carefully examined. As suggested by Wagner (2020), AI can be interpreted as a new type of agent within companies. It could be seen as a new form of ‘capital’ or ‘production factor,’ distinct from human labor. In the context of real estate, AI systems enhance the due diligence process by improving data accuracy, speed of analysis, and predictive capabilities, thereby transforming traditional investment strategies and operational workflows.

### **3.2 Geopolitics and regulation of AI**

The need for more detailed regulation of AI and robotics applications, especially in fields like real estate due diligence, could be effectively met through a form of self-regulation that acts both in a complementary and integrative manner. However, it is important that this self-regulation does not completely absorb the regulatory content, as otherwise there would be a risk that public authorities would abandon the essential task of balancing different values, interests, and subjective positions. This could lead to decisions of public importance being taken away from the democratic process and political deliberation (Ferrarese, 2006).

In relation to this aspect, European institutions have outlined an initial path, starting from the idea that the adoption of technically developed rules by private actors in the field of AI can facilitate trade and foster technological progress in sectors including real estate. However, there are several aspects that are still controversial, such as the need to balance defining the powers to be attributed to private entities in charge of standardisation on the one hand and finding legal instruments that limit the self-determination of private individuals on the other.

In addition, issues of a private-sector nature arise in connection with the regulation of intellectual property, especially when standards-based intellectual property rights limit access to political norms based on those same standards. This is particularly relevant in real estate, where the proprietary nature of AI tools used in due diligence can complicate matters of liability and transparency. It is unclear who can be held responsible for the contents of such standards.

On the regulatory front, the European Union seems to be increasingly moving towards moving beyond the traditional legal regulatory techniques typical of civil law countries in the field of AI, as demonstrated by the adoption of the European Parliament's Civil Law Recommendations on Robotics (CLRR) of 16 February 2017. To this end, in addition to the establishment of the European Robotics Agency in 2015, the Horizon 2020 programme was launched, which includes a specific section dedicated to research and development (known as SPARC) aimed at promoting partnerships between public and private entities to develop a strategy for the development of robotics and AI on the European continent.

In defining the limits on the use of artificial intelligence systems involving personal information with a significant impact on the political, social, and economic spheres, a decisive factor can be identified in the process leading to 'digital' or 'automated' decision-making. This is crucial for AI-driven due diligence in real estate, where ensuring the accuracy and fairness of data-driven assessments is essential. It is crucial to be able to trace the path from data collection to the decision affecting the individual through algorithmic processes often based on huge amounts of data and machine learning methods. This is essential not only to verify that the data is sufficiently unbiased but also to ensure that the conclusions reached by the system are rational and justifiable based on that data (Bassini, et al., 2018).

With reference to the 2017 European recommendations, one aspect of relevance emerges, mainly related to the proposal to establish an independent body for the regulation of artificial intelligence and robotic applications, characterized by a multidisciplinary nature encompassing engineering, legal, and ethical expertise. This body would be entrusted with several well-defined tasks, including monitoring technological progress in the field,

identifying key ethical, legal, and social (ELSE) issues, assessing the adequacy of national legislation in promoting the advancement of robotics and AI technology without compromising its responsiveness to debated issues, proposing reforms to ensure up-to-date legal protection, and out-of-court settlement of disputes concerning the use of AI tools in fields like real estate due diligence.

In this resolution, the European Parliament not only urges the Commission to define common European strategies, but also lists the main characteristics that an automated AI system should possess, such as autonomy through sensors or the exchange of data with the environment, learning from experience and interaction, and adaptation of behaviour to the environment.

The need to update and complement, if necessary, the Union's legal framework with ethical principles reflecting the complexity of the implications of robotics is also emphasized. The need for cooperation between Member States and the Commission to ensure consistent cross-border standards and promote collaboration between European industries in the field of robotics is also highlighted (Rossi, 2017).

It is important to note that the adaptation of the legal framework to technological applications of AI is not a recent phenomenon but has emerged since the 1980s, when the importance of considering the effects of AI on fundamental rights was recognized without necessarily having to create a 'special' law dedicated to robotics.

Leaving aside for the moment the criminal dimension (since state legislation has not yet substantially addressed the issue of criminal liability in the use of robotic technologies in everyday life), it is important to note that there are several civil and administrative provisions concerning decisions taken and actions performed by artificial intelligence devices. This applies to both contract law and non-contractual liability in the context of real estate transactions.

One of the most discussed aspects concerns liability for damages caused using a defective artificial intelligence system. This problem seems insoluble considering that the main feature of such systems is the continuous updating of self-learning technological

mechanisms. This aspect, which has not yet been considered by legislators, makes the definition of a defect in a product that evolves in an intricate web of causal links even more complex (Pagallo, 2017).

Artificial intelligence-based tools represent for each state not only a means of political power, but also an expression of its diplomatic skills. Although we will not dwell on the positions of China and the United States, it is important to emphasise the crucial role the latter plays on the geopolitical level in relation to the topic at hand. It is in the United States, in fact, that the National Security Commission on AI was established in 2018 by the US Congress. This commission, created with the aim of ‘winning the age of artificial intelligence’, highlighted the close interconnection between AI systems and the quest for power (Crystallini, 2021).

Despite a different approach to artificial intelligence technologies compared to other states, European institutions have demonstrated a full awareness of the global challenge posed by such devices. To this end, in April 2021, the European Commission presented the first global plan to regulate artificial intelligence, including the Digital Services Act, the Digital Markets Act, the Digital Decade, the Cybersecurity Strategy and the Data Strategy.

It is evident that the current connection between technology and global political balances cannot be overlooked. The regulation of artificial intelligence devices on a global scale is indeed a geopolitical battleground. In this context, ‘cutting ties with US technology companies, at a time when the US is fighting for supremacy with China, is a geopolitical act. Excluding Chinese telecommunications companies from European networks is a geopolitical decision. Europe's actions have geopolitical consequences that go beyond the Union' (Crystallini, 2021).

Clearly, it is important to consider not only the international repercussions of European policies, known as the ‘Brussels effect’, but also the role played by technology in major historical revolutions and its impact on the economy, international relations and global political and military balances.



In this context, the study conducted by the Artificial Intelligence Diplomacy (AIDA), a special committee of the European Parliament on artificial intelligence in the digital age, carefully analyzed the effects of artificial intelligence devices in various areas of foreign policy and international relations, identifying four main areas of interest. These areas include the competition for technological supremacy between China and America, which was confirmed as one of the crucial nodes in the competition between the two great powers, as also stated by Bill Burns, Director of the CIA. In particular, the US and China are both engaged in Military AI projects, using artificial intelligence in the military to introduce new paradigms of war defense. According to the US National Security Commission, the US needs ubiquitous AI capabilities to defend against AI-enabled threats.

However, there are significant differences between the two nations, especially regarding access to and quality of data used for AI. Although China has a high number of internet and smartphone users, the data processed by the US is often of higher quality in terms of usefulness and relevance for various AI applications (Franke, 2021).

In the wake of the technological competition for supremacy in the field of artificial intelligence, further negative aspects have emerged that have not escaped the attention of authors such as Ian Hogarth. According to Hogarth, the rapid progress in machine learning could incentivize states to adopt strongly nationalistic behaviour. As an expert in national AI research and support policies, Hogarth suggests that in order to achieve a leading position over other powers, states might opt for more protectionist policies. This could manifest itself through hindering acquisitions by foreign companies of domestic companies engaged in AI, to preserve their independence. Similarly, they could block foreign investments for the benefit of domestic AI companies or disrupt international partnerships (Cristallini, 2021).

Among the risks associated with possible nationalistic overtones, the threat to the free movement of goods and free trade between EU member states emerges above all. This threat, which is intrinsically linked to the founding principles and values of the European Union, would also have inevitable repercussions on the cooperative relations between the member states. In defining the limits on the use of artificial intelligence systems involving

personal information with a significant impact on the real estate market, a decisive factor can be identified in the process leading to ‘digital’ or ‘automated’ decision-making. It is crucial to be able to trace the path from data collection to the decision affecting real estate investments through algorithmic processes often based on huge amounts of data and machine learning methods. This is essential not only to verify that the data is sufficiently unbiased, but also to ensure that the conclusions reached by the system are rational and justifiable based on that data (Bassini, et al., 2018).

With reference to the 2017 European recommendations, one aspect of relevance emerges, mainly related to the proposal to establish an independent body for the regulation of artificial intelligence and robotic applications, characterized by a multidisciplinary nature encompassing engineering, legal, and ethical expertise. This body would be entrusted with several well-defined tasks, including monitoring technological progress in the field, identifying key ethical, legal, and social (ELSE) issues, assessing the adequacy of national legislation in promoting the advancement of robotics and AI technology without compromising its responsiveness to debated issues, proposing reforms to ensure up-to-date legal protection, and out-of-court settlement of disputes concerning the use of AI tools in real estate transactions.

In this resolution, the European Parliament not only urges the Commission to define common European strategies, but also lists the main characteristics that an automated AI system should possess, such as autonomy through sensors or the exchange of data with the environment, learning from experience and interaction, and adaptation of behaviour to the environment.

The need to update and complement, if necessary, the Union's legal framework with ethical principles reflecting the complexity of the implications of robotics is also emphasised. The need for cooperation between Member States and the Commission to ensure consistent cross-border standards and promote collaboration between European industries in the field of robotics is also highlighted (Rossi, 2017).

It is important to note that the adaptation of the legal framework to technological applications of AI is not a recent phenomenon but has emerged since the 1980s when the

importance of considering the effects of AI on fundamental rights was recognized without necessarily having to create a ‘special’ law dedicated to robotics.

Leaving aside for the moment the criminal dimension (since state legislation has not yet substantially addressed the issue of criminal liability in the use of robotic technologies in everyday life), it is important to note that there are several civil and administrative provisions concerning decisions taken and actions performed by artificial intelligence devices. This applies to both contract law and non-contractual liability in the context of real estate transactions.

One of the most discussed aspects concerns liability for damages caused using a defective artificial intelligence system. This problem seems insoluble considering that the main feature of such systems is the continuous updating of self-learning technological mechanisms. This aspect, which has not yet been considered by legislators, makes the definition of a defect in a product that evolves in an intricate web of causal links even more complex (Pagallo, 2017).

Artificial intelligence-based tools represent not only a means of political power for each state but also an expression of its diplomatic skills. Although we will not delve into the positions of China and the United States in detail, it is important to emphasize the crucial role the latter plays in the geopolitical landscape concerning AI regulation. In the United States, for instance, the National Security Commission on AI, established in 2018 by Congress, highlights the close interconnection between AI systems and the quest for global dominance (Crystallini, 2021).

Despite differing approaches to AI technologies compared to other states, European institutions have demonstrated a full awareness of the global challenges posed by such technologies. In April 2021, the European Commission presented the first global plan to regulate artificial intelligence, including the Digital Services Act, the Digital Markets Act, the Digital Decade, the CyberSecurity Strategy, and the Data Strategy.

The connection between technology and global political balances cannot be overlooked. The regulation of AI on a global scale is indeed a geopolitical battleground. For example,

cutting ties with US technology companies while the US competes with China for supremacy, or excluding Chinese telecommunications companies from European networks, are geopolitical decisions with far-reaching consequences (Crystallini, 2021).

It is crucial to consider not only the international repercussions of European policies, known as the 'Brussels effect', but also the role played by technology in historical revolutions and its impact on the economy, international relations, and global political and military balances. In this context, the study conducted by the Artificial Intelligence Diplomacy (AIDA), a special committee of the European Parliament on AI in the digital age, analyzed the effects of AI in various areas of foreign policy and international relations, identifying four main areas of interest.

These areas include the competition for technological supremacy between China and the US, which is a critical factor in the global AI race. Both nations are engaged in military AI projects, introducing new paradigms of defense. According to the US National Security Commission, the US needs ubiquitous AI capabilities to defend against AI-enabled threats. Significant differences exist between the two nations, particularly regarding access to and quality of data used for AI applications (Franke, 2021).

The competition for AI supremacy has also led to potential negative consequences, such as increased nationalism. Rapid progress in machine learning could incentivize states to adopt protectionist policies, hindering foreign acquisitions of domestic AI companies and blocking foreign investments in favor of local firms (Cristallini, 2021).

Such nationalistic tendencies could threaten the free movement of goods and free trade within the EU, impacting cooperative relations among member states. Furthermore, the rise of private power over public power due to AI's influence is a major societal shift. Research in AI, once dominated by state or university laboratories, is increasingly concentrated in private companies, raising concerns about the balance of power and control over AI technologies.

### **3.3 Future trends and jurisprudential implications**

The need to regulate the use of automated technology has not escaped attention even at the supranational level. This awareness led the European Commission to adopt a strategy aimed at defining all social and economic aspects of increased investment in AI research and innovation. For the real estate sector, which is heavily influenced by regulatory frameworks, these developments are particularly pertinent.

After the launch of a coordinated plan among the Member States, it became clear that although national laws already contain various regulatory provisions on transparency, traceability, and surveillance, these have little impact on economic sectors like real estate. Considering the rapidly developing AI sector, it becomes necessary to identify a common regulatory framework at the European level. The German Data Ethics Commission has proposed a five-tier regulatory system, each with a different risk standard, depending on the dangerousness of the AI application used. This system is particularly relevant for AI applications in real estate, such as property valuation, risk assessment, and investment analysis.

Similarly, Denmark has initiated its own model for data ethics, while Malta has adopted a voluntary certification system for AI devices. The absence of a unified EU-wide approach to automated technology risks undermining the unity of the internal market, with consequences for legal certainty and citizens' trust in European institutions, which could impact the confidence in real estate transactions and investments.

Thus, while it cannot be denied that no human process is immune to distortions and errors, the risks associated with the use of AI technologies without adequate control mechanisms are significantly greater. This is especially true when the AI system learns during its operation, exposing it to risks arising from the practical effects of correlations or patterns identified within a large dataset. In the context of real estate, this could mean incorrect property valuations or flawed risk assessments.

Several distinctive aspects of artificial intelligence applications, such as their complexity, opacity, and unpredictability, can circumvent the protection system established by the European Union, effectively rendering such protection ineffective. Moreover, the absence

of a clear regulatory framework on security poses a significant risk, especially for companies operating in the European Union and marketing products incorporating artificial intelligence systems, potentially undermining the competitiveness in real estate investments and related markets.

The Regulation opens with the Recitals, which provide a broad historical and social background, highlighting the need for the EU to adopt clear rules concerning the development of artificial intelligence systems relevant to real estate transactions. It recognizes the technological progress and benefits that artificial intelligence can bring to the real estate industry and society, emphasizing its competitive advantages and socially and environmentally beneficial results.

Notwithstanding the responsibility of economic operators for the compliance of artificial intelligence systems with existing legislation, the European Commission proposes actions to improve the regulatory framework, about compliance with national and European legislation and product conformity with the European single market. The opaque nature of artificial intelligence systems makes compliance with fundamental rules and rights difficult, requiring clarification of existing provisions. Furthermore, there is a debate as to whether autonomous software should be covered by European product safety legislation, as currently the regulation only applies to physical products, not to services using artificial intelligence (Carbone and Longo, 2021).

The changing functionality of artificial intelligence systems is a profile that is not adequately addressed by the current legislation, which mainly focuses on the risks associated with placing products on the market. However, artificial intelligence devices are subject to continuous software updates and machine learning processes, which may cause alterations in their functioning, or the emergence of new risks not identified at the time of market introduction. These issues become pertinent in real estate transactions where AI technologies are utilized for property valuation, risk assessment, and investment analysis.

Another issue concerns the uncertainty in the allocation of responsibilities along the supply chain. European legislation usually assigns full liability for any defects in the product and its components to the manufacturer. However, it remains to be defined how

the liability regime works when the AI application is subsequently integrated by a party other than the manufacturer, as supranational legislation does not provide specific guidance in this regard. This is particularly relevant in real estate due diligence, where multiple stakeholders may be involved in implementing AI-driven tools.

Furthermore, there is the evolving concept of security, with risks related to cyber threats and the use of artificial intelligence systems in everyday applications such as household appliances. Some Member States have reacted by adopting domestic regulatory provisions to address these new challenges, but this could undermine the European single market if national regulations diverge. A common approach among all Member States would therefore be desirable to ensure the competitiveness of European companies in global markets, particularly within the real estate sector.

The proposal for a regulation aims to ensure that the new legal framework applies to all services using artificial intelligence technologies, in line with what was set out in the White Paper, to effectively achieve its objectives without imposing excessive burdens on small and medium-sized enterprises. The Commission suggested adopting a risk-based approach, which is considered the only method capable of ensuring proportionate supranational legislative intervention. However, this approach requires a classification of automated devices according to their level of risk and the identification of clear and easily understandable criteria to make this distinction.

According to the Commission, determining the level of risk of an AI application requires consideration of the interests involved, the product sector, and the implications in terms of security, fundamental rights, and consumer protection. An AI device is considered high-risk if it is used in a sector with inherently risky activities, such as healthcare, energy, utilities, transport, and real estate. This classification aims to limit regulatory intervention to those sectors with higher risks and can be updated periodically according to developments.

The second criterion for classifying an AI device as high-risk is that the risk associated with its use must be significant. Not all technological risks fall into this category, but in the case of AI applications in real estate, the implications of errors can be substantial, affecting property values, investment decisions, and market stability.

For example, an AI system used in a hospital to manage bookings does not present a significant risk, even if it is used in a risky area. The risk assessment must be based on the concrete use of the device, such as AI applications that produce legal effects or other significant consequences on people's rights, or that entail risks of injury, death, or significant material or immaterial damage.

In the realm of real estate investments and corporate finance, the two cumulative criteria apply only to high-risk AI applications. However, there are exceptions where the use of AI devices is considered significantly risky per se, regardless of industry or use. These exceptions include:

1. Use of AI in personnel selection procedures, to ensure equal access to the labor market.
2. Use of remote biometric identification technologies and intrusive surveillance.

In the future regulatory framework, the high-risk devices and exceptions mentioned will be subject to stricter requirements regarding data retention, information to be shared, human surveillance, requirements for particular AI applications (such as biometric identification), and training data. In the context of real estate, these regulations would impact AI-driven due diligence processes, property valuation systems, and automated investment analysis tools.

In machine learning, training data is a set of data used to 'teach' a supervised system. It has been emphasized many times that no AI system can operate without a huge amount of data. However, it is important to emphasize that the functioning of these systems (and the resulting decisions) is strictly dependent on the type of data used during training. Therefore, measures need to be taken to ensure that training data comply with EU values and standards, particularly concerning security and the protection of fundamental rights.

De iure condendo, with reference to the training data of AI applications, the following could be envisaged:

- **Requirements to guarantee the security of AI systems:** Ensuring that the devices comply with the security levels laid down in EU law, which includes



ensuring that the datasets used for training are large enough to cover all possible scenarios, thereby avoiding dangerous situations in real estate evaluations and risk assessments.

- **Measures to prevent discrimination** in the use of AI systems by requiring the use of representative datasets that adequately reflect characteristics such as gender, race, and ethnicity. This is crucial in real estate to prevent biases in property valuation or risk assessments that could impact investment decisions.
- **Obligations to keep records of training data used**, including documentation of system programming and validation procedures. These records and documents should be kept for a limited and reasonable period to ensure effective enforcement of the legislation and should be available upon request for testing or inspection by competent authorities, while protecting confidential information.
- **Detailed requirements on information obligations**: Mere record-keeping is not sufficient for transparency. Information on high-risk AI systems must be fully shared, including the purpose for which the device was designed, the conditions under which it operates, and the expected level of accuracy. This information is crucial for those using the systems, as well as for competent authorities and stakeholders in real estate transactions.
- **Clearly inform citizens when they are interacting with an AI system rather than a natural person**: Although the GDPR already has similar data protection provisions, it may be necessary to provide additional information to citizens to achieve European AI objectives. The information should be concise, objective, easily understandable, and presented in a context-appropriate manner.

Another aspect to which the European Commission has devoted particular attention is human surveillance, i.e., the activity that ensures that an AI system does not compromise personal autonomy. This expectation is based on the idea that the goal of reliable, human-centered, and ethical AI can only be achieved through adequate human involvement in the design of high-risk automated applications. In the realm of real estate, this means that human oversight is essential in AI-driven due diligence processes to ensure accuracy, fairness, and compliance with legal standards.

## Chapter 4

### **The legal repercussions of the use of artificial intelligence in the real estate sector: analysis of a practical case**

#### **4.1 The real estate market and privacy management using artificial intelligence**

As with any new technology, there are challenges to be faced with artificial intelligence. As mentioned earlier, much of artificial intelligence is about collecting, manipulating, evaluating and making decisions on data without human intervention. This will raise issues in the UK legal context, including areas such as data protection, privacy, intellectual property, financial crime, fraud prevention and equality. It will be necessary to conduct an assessment of compliance with the existing legal framework, which is likely to require significant updates to keep pace with technological advances (D'Arienzo, 2015). Real estate investment is undergoing a significant transformation due to the adoption of artificial intelligence (AI), which is significantly affecting various legal aspects of the real estate market. First of all, AI is revolutionising data analysis and the prediction of real estate values. Machine learning algorithms, which can process large amounts of data on property prices, market trends and occupancy rates, provide more accurate predictions of future property values. This leads to greater certainty in property valuations and, consequently, in sales and rental contracts, where parties can base their decisions on more accurate and reliable information.

Furthermore, property valuation using AI has significant legal implications. The algorithms used for valuation must comply with current regulations on transparency and accuracy. Automated valuations must comply with the legal criteria of fairness and non-discrimination, ensuring that estimates are based on objective and relevant data, without introducing bias that may violate the rights of the parties involved (Favilukis et al., 2017).

Automated property management represents a further development with legal relevance. Predictive maintenance systems and tenant request management, if automated via AI, must comply with privacy and data protection regulations. It is essential to ensure that the information collected and processed is treated in accordance with the General Data Protection Regulation (GDPR) and other privacy laws to protect the rights of tenants and landlords (Demyanyk, Y., Van Hemert O., 2011).

Personalised AI-based marketing raises legal issues related to consumer protection. Marketing campaigns have to comply with regulations on misleading advertising and unfair commercial practices. In addition, the use of personal data for marketing purposes must be authorised by the parties concerned, in accordance with data protection laws.

Risk assessment using AI involves analysing historical data and trends to identify potential risks associated with real estate investments. Risk assessment tools must comply with anti-money laundering regulations and financial transaction transparency laws. Investors need to be aware of the identified risks and their legal implications in order to take mitigation measures that comply with applicable regulations.

In the design and construction sector, the adoption of AI technologies must comply with building and planning regulations. The use of AI for predictive modelling and site management must ensure compliance with occupational safety and environmental sustainability regulations, avoiding violations that could lead to legal liabilities for builders and designers.

AI-enhanced augmented reality (AR) and virtual reality (VR) experiences used in the presentation and sale of properties must comply with information transparency regulations. Virtual presentations must provide an accurate and truthful representation of properties to avoid accusations of misleading advertising or fraud. Optimising real estate portfolios through AI requires management in compliance with financial and tax regulations. Investors must ensure that investment strategies suggested by algorithms

comply with applicable tax and financial laws to avoid penalties or negative legal implications (Fuster, 2014).

Artificial intelligence is transforming the real estate industry with profound legal implications. From data analysis to automated management, from personalised marketing to risk assessment and intelligent design and construction, AI is improving the efficiency and accuracy of real estate investments. However, it is crucial that all activities performed by AI comply with applicable legal regulations to ensure the protection of the rights of the parties involved and the legitimacy of real estate transactions (Gellman, 2017).

Artificial intelligence and machine learning, commonly referred to as 'real estate AI' in the real estate industry, represent advanced technologies that have the potential to optimise real estate transactions, improve asset management and enrich the overall customer experience.

In recent years, artificial intelligence has introduced several advanced solutions in the real estate sector. One of the best-known applications is rapid property valuation, which allows the value of a home to be estimated in a matter of moments, considering various factors such as location, property condition, market trends and energy class. This method is significantly faster than traditional valuations, although still not as accurate (Koops et al., 2017).

Another relevant application is the prediction of real estate market demand. Machine learning algorithms analyze historical, economic and demographic data to anticipate future market trends in a specific geographic area. These tools can be of great use to industry professionals, such as builders, real estate agents and architects, allowing them to adapt their projects and strategies according to market forecasts.

Similarly, buyers and investors can benefit from the forecasts provided by AI to make more informed decisions. This includes searching for properties to buy or rent, consulting property listings, projecting mortgage payments and estimating asset values. Property management, which includes all the activities and processes involved in controlling and

administering a property, is one of the most complex aspects of the industry. Machine learning can become a valuable ally in this area, especially when it comes to preventive maintenance. By installing sensors in buildings, the status of electrical, plumbing and other critical systems can be constantly monitored. Artificial intelligence analyses this data in real time, allowing potential faults to be predicted before they occur. This approach not only reduces long-term maintenance costs, but also ensures the operational continuity of properties (Justiniano et al., 2015).

In addition to optimising various internal processes, artificial intelligence in real estate is significantly improving the customer experience. Tools such as chatbots and virtual assistants are able to answer customer questions immediately, greatly improving customer service and reducing waiting times. In addition, AI can be used to create virtual tours of properties, allowing potential buyers to explore homes remotely. This makes the property search much more engaging and informative.

The future of AI in the Italian real estate sector is shaping up to be a crucial moment in the transformation of an industry historically characterised by manual practices, experience and interpersonal relationships. The widespread adoption of advanced AI applications, such as predictive analytics, process automation and personalisation of customer interactions, is shaping a new era of efficiency and decision-making precision.

Operators in the real estate sector will face ethical and regulatory challenges, ensuring proper data management and transparency that preserves the trust of all parties involved.

In some Member States, before the GDPR, national supervisory authorities had no powers in the case of data breaches and, therefore, this new procedure raises several issues in terms of resources and organisation. For this reason, the supervisory authorities of each Member State should participate in the cooperation mechanisms provided for by the Regulation and work together with the supervisory authorities of other Member States and the European Commission (if necessary) to support formal and informal exchanges of information and help those in need. For example, in the event that a supervisory body's

decision is subject to appeal before national courts, the supervisory authority could draw on the greater expertise of another Member State through proactive information sharing and case law on the use of sanctioning powers to address it. Cooperation and information exchange lead to a higher level of consistency and a harmonised approach to administrative sanctions (Riccio et al., 2022).

The General Data Protection Regulation establishes uniform rules applicable to all Member States regarding potential administrative sanctions in the event of a breach of the provisions of the Regulation. Compared to previous drafts, the administrative sanctions that are enshrined in Article 83 of the GDPR seem to have been significantly increased. The new regulation establishes two different levels of administrative sanctions. Article 83(4) of the GDPR states that ‘infringements of the following provisions shall be subject to administrative pecuniary sanctions of up to EUR 10,000,000 or, in the case of an enterprise, up to 2 per cent of the total annual worldwide turnover in the preceding business year, whichever is the higher’. The fifth paragraph of Article 83 of the GDPR includes a list of more serious violations and thus sets the maximum level of administrative fines ‘up to EUR 20,000,000 or, in the case of an undertaking, up to 4 per cent of the total annual worldwide turnover in the preceding year, whichever is higher’.

The differentiation of the highest level of fines in paragraphs 4-6 of Article 83 of the GDPR indicates that violations of paragraph 4 are considered lighter than violations of paragraph 5. However, a violation of an obligation under paragraph 4 may be sanctioned with a level 2 administrative fine if it has previously been dealt with by an order of the supervisory authority pursuant to Article 58(2), yet the controller or processor has failed to comply with that order. At this point, it is important to state that these three paragraphs of Article 83 of the GDPR set the upper limit of the administrative sanctions that can be imposed in the event of a breach of any of the above provisions. Thus, each breach of the Regulation will not be sanctioned with 10 or 20 million euros, nor with 2% or 4% of the company's annual worldwide turnover, but the administrative fine could be much smaller

than these sums, as long as it is appropriate to the specific breach (effective, proportionate and dissuasive) and the objective pursued by the supervisory authority is achieved. Therefore, the competent supervisory authority is the one that determines the imposition and amount of the administrative penalty in each individual case.

#### **4.2 The ‘cybernetics of law’ in the real estate sector**

The future of AI in the Italian real estate sector calls for a synergy between human skills and technology, fostering an intelligent management of resources and a dynamic evolution of the sector, in tune with the changing needs of society.

The link between Artificial Intelligence, Robotics and Regulation has been the subject of a lively legal debate in recent years. So far, the focus of the relationship between IT and law has been on the assistance provided by legal technology to legal practitioners or on the new legal dynamics generated by the evolution of IT in the human context. It is reasonable to assume that in the future this relationship will be enriched with the regulation of non-human conduct.

The doctrine has coined the expression ‘cybernetics of law’ to describe the scenario in which computers are programmed to automatically apply the law (e.g. issue administrative or judicial orders) or to conclude contracts without human intervention. The use of intelligent machines capable of performing sophisticated cognitive processes, such as thinking, perceiving, learning, solving problems and making decisions, offers humanity new opportunities to integrate human and artificial intelligence, changing the way people work and interact.

In the last two years, significant efforts have been made to define policies to promote the development of Artificial Intelligence: the United States, the United Kingdom, France, Japan, India and China have published policy documents in this regard. AI already permeates many aspects of our daily lives: in Denmark, for example, AI systems are used to diagnose a cardiac arrest based on the sound of the voice of the person calling for

medical help. In Austria, AI assists radiologists in detecting tumours by instantly comparing X-ray results with a vast amount of medical data. In the agricultural sector, many livestock farms adopt AI systems to automatically adapt the animals' diet according to their needs by constantly monitoring their movements, temperature and food consumption.

AI can greatly improve predictive analyses, allowing companies to assess with greater certainty the long-term effects of their market decisions. Increasing attention must therefore be paid to regulatory aspects, taking into account the complex and numerous legal issues that arise and will arise. It is essential to establish a solid legal framework based on fundamental rights, including the protection and respect of personal data, in view of the fact that AI and robotics will drive a new approach to service delivery, termed 'machine-to-machine': many services will be delivered through direct interactions between objects, without human intervention.

Arguments such as liability for actions resulting from algorithms and consumer protection with respect to business practices performed directly by software without human intervention will become key to ensuring a complete and orderly economic development. Artificial intelligence proves to be an extremely powerful analytical tool in the management of investment portfolios, due to its ability to evaluate data on a portfolio or a range of asset classes. Its applications include: Assessing tenants and gathering baseline information, going beyond traditional credit and other preliminary tenant checks; Managing crucial information and automating the portfolio; Analysing resource utilisation through a range of metrics to improve efficiency and facilitate decision-making; Implementing predictive maintenance programmes and automating maintenance activities, in line with property and occupant monitoring; Identifying unused space and developing solutions to maximise the utilisation of available resources (Haughwout et al., 2011).



The predictive capabilities of Artificial Intelligence will play a key role in the green transformation of the real estate sector, offering solutions to drive the market towards greater compliance with ESG (environmental, social and governance) principles. In particular, considering the European Union's ambitious goal of making buildings zero-emission by 2030, AI and data analytics will be of crucial importance to comply with the new regulations with maximum efficiency.

These tools enable the automation of critical processes such as data collection and analysis, providing valuable insights to improve the environmental performance of buildings and enabling businesses to identify and address inefficiencies early on. They also play a significant role in promoting sustainable design and construction practices, as well as sustainability-oriented property management. Europe has long explicitly recognised privacy as a human right. Europeans' commitment goes beyond the home, similar to much of US law, which is to include the protection of family life, communications and reputation, as the information age takes hold, in the context of data processing. While US jurists may refer broadly to 'privacy' or 'information privacy', European law refers to information privacy as 'data protection'. Data privacy and information privacy refer to more or less the same concept. In Europe, data protection is increasingly seen as separate from the right to privacy. Data protection focuses on data being used fairly and with due process, while privacy preserves the ideal of privacy.

As in the 1995 directive, the first article of the GDPR emphasises the dual objective of promoting the free movement of personal data within the EU - to help businesses - and protecting individuals and their personal data. However, the GDPR emphasises the latter objective. The GDPR establishes regulatory preferences that conflict with information-intensive industry practices, particularly those performed by third parties. The GDPR puts pressure on big data and machine learning business models, at least in their current version (Schwartz & Solve, 2019).

Article 2 of the GDPR states that the Regulation applies to the ‘wholly or partly automated processing of personal data’. Therefore, the material scope of data protection depends on the personal data to be processed. The definition of personal data is provided by Article 4(1), from which four elements can be deduced: it is (i) any information, (ii) relating to (iii) an identified or identifiable natural person (iv). The first element indicates that broad categories of data are covered, regardless of their content or format. The second element emphasises the personal nature of data protection and excludes certain types of data from the scope of the regulation, such as data on companies. Finally, the third element indicates that the correlation with the criterion is fulfilled when the data reveal information about an individual; thus, data relating to an individual are considered when the data concern that individual, and may be in the form of content, purpose or resultant element. The last element is called the identifiability element, because it is the lowest threshold for the application of data protection with respect to identified individuals.

Article 5 summarises the criteria for the whole principle of data protection, listing all the general principles. These are: lawfulness, fairness and transparency; purpose limitation; data minimisation; accuracy; storage limitation; integrity and confidentiality; accountability. Any collection and processing of data must comply with these principles. The operationalisation and affirmation of these principles in the research cycle requires a proactive design and conceptualisation of privacy as the default setting for any data collection exercise. Moreover, it must be incorporated into both the systems design of any information architecture and the general organisational practices of research agencies and clients.

Accountability requires organisations to implement appropriate technical and organisational measures and to be able to demonstrate what they have done and its effectiveness when required. This may also include the use of privacy impact assessments for high-risk processing. In addition, the GDPR has introduced a mandatory data breach notification regime. A key change to note in lawful processing is the standard required

for consent. Indeed, consent must be freely given, specific, informed and evidenced by a clear affirmative action. It must be verifiable, with a higher standard of explicit consent required for the processing of sensitive data (Goddard, 2017).

Data processing is only fair if it is transparent and this means that there must be openness in data processing through effective communication with individuals, including through the use of information notices. GDPR is user-centred, so transparency in a GDPR context implies a shift from compliance with legal regulations to a personalised, reflective and dynamic approach. Information must be provided to individuals, including details on recipients, retention periods and the range of their individual rights, such as access and portability. All this must be provided in accessible language to ensure that it can be easily understood.

The GDPR provides for a decentralised implementation system, whereby each member state 'shall provide for one or more independent public authorities to monitor the application of the GDPR'. Each supervisory authority 'shall be competent to perform the tasks assigned to it and to exercise the powers conferred on it in accordance with the GDPR'. In the case of cross-border processing, the GDPR has established a One-Stop-Shop system, whereby the authority of the principal establishment of the controller or processor will have primary responsibility for dealing with and investigating any EU-wide complaints about the processing of personal data. This allows companies operating in different countries to deal with a single DPA (the DPA of their main establishment), being the 'controller's or processor's sole interlocutor for cross-border data processing'.

Although, in certain circumstances, a supervisory authority other than that of the controller's or processor's main establishment may be competent to handle a complaint or investigate a possible GDPR breach, in particular when 'the subject matter relates only to an establishment in its Member State or substantially affects data subjects only in its Member State', this can only be done if the lead supervisory authority decides not to handle the case. In the real estate sector, traditionally characterised by offline transactions,

blockchain is bringing significant innovations. This technology acts as a decentralised digital ledger, providing traceability and security to transactions without the need for central intermediaries such as banks or notaries (Schwartz & Solve, 2019).

Among its most relevant applications in real estate are smart contracts, digital contracts capable of executing actions automatically when certain conditions occur, and tokenization, which allows physical real estate assets to be transformed into digital tokens representing the property or a part of it, thus facilitating the buying and selling process.

Despite its considerable advantages, blockchain also faces challenges and critical issues. Smart contracts may not take into account any unforeseen variables, and the absence of traditional intermediaries could be an obstacle for those without an in-depth knowledge of law (Duca et al., 2016).

The increasing incorporation of new technologies in the real estate sector offers numerous advantages, but also brings with it significant risks in terms of privacy and security. The digitisation of property management and processes generates a huge amount of sensitive data, exposing the sector to various cyber threats, ranging from phishing to malware attacks. These attacks can not only cause considerable financial damage, but also compromise the integrity and reputation of companies and professionals. Therefore, it becomes essential that cybersecurity becomes a priority in the real estate sector. Only by investing in advanced technological solutions and adopting strict security protocols will it be possible to protect data, preserve reputations and maintain customer trust in an increasingly interconnected environment.

#### **4.3 Implementation of an artificial intelligence system for property valuation**

The case of Real Estate Tech, a real estate company that implemented an artificial intelligence system to automatically assess the value of properties, offers a practical example of the legal implications of using AI in real estate. This system uses advanced algorithms to analyse a wide range of data, including property characteristics,

geographical location, market conditions and recent transactions. Marco, a potential buyer, finds a house he is interested in on Real Estate Tech's website and, trusting the estimate provided by the AI, decides to make an offer based on this valuation. However, after completing the purchase, he discovers that the actual market value is significantly lower than that estimated by the algorithm.

This scenario raises several legal issues. First, the question arises as to the legal validity of the market value estimate provided by the AI. It is necessary to understand whether the law recognises automated valuation as a reliable source for determining the value of real estate. Existing legislation may not be up-to-date to deal with the use of such advanced technologies, which necessitates an examination of property valuation laws and how they can incorporate the use of AI. Real Estate Tech's legal responsibility for the accuracy of valuations provided by AI is another critical issue. Marco, feeling misled by the inaccurate valuation, could sue the company for financial damages suffered. This raises the question of the company's contractual and extra-contractual liability. Product liability laws and theories of contractual and extra-contractual liability could be applied to determine whether Real Estate Tech is legally liable for discrepancies in property valuations provided by its system.

Transparency and disclosure of information regarding the use of artificial intelligence in the valuation process are other important issues. Real Estate Tech must provide clear and understandable information to buyers regarding the methodology used by the artificial intelligence system and its limitations. Lack of transparency could lead to trust and legitimacy issues, negatively affecting the company's reputation and leading to potential litigation.

A further aspect concerns the privacy and security of the data used by the artificial intelligence system. Digitisation and automation involve the collection and processing of a large amount of sensitive data, which exposes the real estate sector to risks of privacy breaches and cyber-attacks. Real Estate Tech has to ensure that buyers' personal and

sensitive data is properly protected and used in compliance with privacy laws, such as the General Data Protection Regulation (GDPR) of the European Union. This case demonstrates how the implementation of artificial intelligence in real estate, while offering significant advantages in terms of efficiency and accuracy, also brings with it a number of complex legal challenges. Issues relating to the legal validity of automated valuations, the legal liability of companies, transparency and data privacy need to be carefully addressed. It is crucial that companies like Real Estate Tech take appropriate measures to ensure legal compliance and protect the interests of consumers, while promoting confidence in the use of advanced technologies in the real estate industry.

The GDPR provides for a decentralised enforcement system, whereby each Member State ‘shall provide for one or more independent public authorities to monitor the application of the GDPR’ (Article 51(1) GDPR). Each supervisory authority ‘is competent for the performance of the tasks assigned to it and for the exercise of the powers conferred on it in accordance with the GDPR’ (Article 55(1) GDPR). In the case of cross-border processing, the GDPR has established a One-Stop-Shop system, whereby the authority of the principal establishment of the controller or processor will have primary responsibility for dealing with and investigating any EU-wide complaints about the processing of personal data (Article 29, WP, 2017). This allows companies operating in different countries to deal with a single DPA (the DPA of their head office), being the ‘controller's or processor's sole point of contact for cross-border data processing’ (Article 56(6) GDPR).

Although, in certain circumstances, a supervisory authority other than that of the controller's or processor's main establishment may be competent to handle a complaint or investigate a possible GDPR breach, in particular when ‘the subject matter relates only to an establishment in its Member State or substantially affects data subjects only in its Member State’ (Article 56(2) GDPR) - this can only be done if the lead supervisory authority decides not to handle the case (Article 56(3) and (5) GDPR).

Consequently, the GDPR has granted disproportionate enforcement power to some DPAs, in particular to DPAs in EU Member States where large digital platforms, such as Apple, Google, Facebook and Amazon, are based. At the same time, data controllers and processors that fall under the supervision of zealous DPAs are more likely to be subject to lengthy investigations and hefty fines, up to EUR 20 million or 4 per cent of the previous financial year's total annual worldwide turnover, whichever is higher (Art. 7 GDPR).

While for large digital platforms the imposition of such fines would not significantly affect their business, for smaller operators it may result in their exit from the market. When an alleged GDPR breach involves an investigation into cross-border data processing, this will be conducted by a lead supervisory authority (LSA). An LSA is an independent public authority in each EU Member State, with the task of protecting the fundamental rights and freedoms of individuals in relation to the processing of their personal data and to monitor and ensure consistent application of data protection laws in the country where they are located. This mechanism is interesting for organisations facing privacy problems, as they can deal with only one regulator for a single decision, despite the fact that the issue affects stakeholders in several Member States. Once an enforcement problem arises, the local supervisory authority must cooperate with the relevant supervisory authorities in other Member States to try to reach a consensus.

Both controllers and processors involved in cross-border processing of personal data can benefit from the one-stop shop principle under the GDPR by identifying a lead supervisory authority. The authority has the primary responsibility for coordinating investigations involving several Member States, which means that companies must deal with a single supervisory authority (D'Arienzo, 2015). The LSA mechanism is only applicable in the context of a company's cross-border processing activities. Accordingly, companies must assess whether they meet one of the following criteria when (i) processing takes place in the context of the activities of businesses or organisations in

more than one Member State; or (ii) processing takes place in the context of the activities of a single establishment, but substantially affects or is likely to substantially affect individuals in more than one Member State.

The GDPR does not allow ‘forum shopping’, which means that it is not possible for an organisation to appoint a particular supervisory authority as the lead supervisory authority on the basis that it is allegedly more lenient in enforcement than another authority. For example, if an organisation claims to have its main establishment in an EU state but has no actual and effective management or decision-making activity regarding the processing of personal data, the relevant supervisory authorities will decide which supervisory authority is the ‘lead’ supervisory authority, using objective criteria and examining evidence (Bassoli, 2018).

Although all supervisory authorities are equal under the GDPR, there will be organisational, technical, financial, structural and cultural differences. Although it is also difficult to assess and compare these differences today, as national laws creating and empowering GDPR supervisors are still being drafted, but undoubtedly these differences will have an impact on the enforcement landscape (Bottazzi & Secchi, 2011).

## **Conclusion**

The integration of artificial intelligence (AI) into the real estate sector presents both transformative opportunities and complex legal challenges. This thesis, titled "Legal Aspects of AI-Driven Due Diligence in Real Estate Investments: Case Studies in Corporate Finance," has explored these issues in detail, particularly through the lens of practical case studies and legal analysis.

### ***Key Findings***

**1. Data Analysis and Property Valuation:** AI-driven data analysis has revolutionized property valuation by providing more accurate predictions of real estate values. However,



these automated valuations must adhere to legal standards of transparency, accuracy, and non-discrimination. Ensuring compliance with regulations like the General Data Protection Regulation (GDPR) is crucial to protect the rights of all parties involved and maintain the integrity of the valuation process.

**2. Automated Property Management:** AI systems used for predictive maintenance and tenant request management bring efficiency but must comply with data protection and privacy laws. These systems need robust security measures to prevent data breaches and ensure that personal information is handled in accordance with legal requirements.

**3. Personalized Marketing and Risk Assessment:** AI's use in personalized marketing raises significant consumer protection issues. Marketing campaigns must avoid misleading practices and ensure that personal data usage is properly authorized. Similarly, AI tools for risk assessment must comply with anti-money laundering regulations and ensure transparency in financial transactions.

**4. Design, Construction, and Augmented Reality (AR)/Virtual Reality (VR):** AI applications in design and construction must adhere to building regulations, occupational safety standards, and environmental laws. Additionally, AR and VR tools used for property presentations must provide accurate representations to avoid legal claims of false advertising.

**5. Cybersecurity and Data Privacy:** The increasing use of AI and digital technologies in real estate necessitates heightened cybersecurity measures. Protecting sensitive data from cyber threats is essential to maintain consumer trust and comply with privacy regulations.

**6. Legal Liability and Transparency:** The case study of RealEstateTech highlighted the legal complexities surrounding AI-driven property valuations. Companies must ensure that their AI systems provide reliable and transparent valuations. Legal liability for inaccuracies and the necessity of clear disclosures about AI methodologies are critical to prevent potential litigation and maintain consumer confidence.

**7. Regulatory Compliance and GDPR:** The GDPR's decentralized enforcement system and the One-Stop-Shop mechanism provide a framework for managing cross-border data processing issues. However, companies must navigate the complexities of identifying the lead supervisory authority and ensuring compliance with GDPR provisions to avoid significant fines and legal consequences.

### ***Recommendations***

- **Legal Framework Updates:** There is a pressing need for updating legal frameworks to address the unique challenges posed by AI in real estate. Legislators should consider new regulations that specifically address AI's role in property valuation, management, and transactions.
- **Transparency and Consumer Education:** Real estate companies using AI must prioritize transparency in their operations. Providing clear information about how AI systems work and their limitations can help build trust and avoid legal disputes.
- **Enhanced Cybersecurity Measures:** Investing in advanced cybersecurity protocols is essential to protect sensitive data and comply with privacy laws. Regular audits and updates to security practices can mitigate the risk of data breaches.
- **Ethical AI Use:** Companies should adopt ethical guidelines for AI use, ensuring that algorithms do not introduce biases or discriminatory practices. Regular reviews and updates to AI models can help maintain fairness and compliance with legal standards.
- **Collaboration with Regulatory Authorities:** Engaging with regulatory bodies and participating in cooperative mechanisms can help companies stay ahead of legal requirements and ensure a harmonized approach to AI regulation in real estate.

The adoption of AI in the real estate sector holds immense potential to enhance efficiency, accuracy, and customer experience. However, it also introduces significant legal challenges that must be carefully managed. By ensuring compliance with existing laws, prioritizing transparency, and adopting robust cybersecurity measures, real estate

companies can harness the benefits of AI while safeguarding the rights and interests of all stakeholders. This thesis underscores the importance of a balanced approach, integrating technological innovation with rigorous legal oversight to foster a sustainable and legally sound real estate market.

## Summary

This thesis explores the legal aspects of integrating artificial intelligence (AI) into due diligence processes for real estate investments, focusing on practical case studies in corporate finance. The research aims to understand how AI can enhance real estate transactions and the associated legal implications.

**Chapter One** introduces the background and context of AI in real estate investments, providing a foundational understanding of the study's context. It outlines the primary goals of the research, specifying the key questions the study seeks to answer. The significance and relevance of the study are discussed in light of current technological, legal, and real estate industry trends. The chapter also defines the boundaries of the research and acknowledges its limitations, detailing the research methods and approaches used to collect and analyze data.

**Chapter Two** reviews traditional due diligence practices within corporate finance, establishing a baseline for comparison. It traces the historical development and changes in due diligence practices in the real estate sector. The chapter highlights specific examples of how AI has been applied to enhance and streamline due diligence processes in real estate. It examines the effects of AI on investment decisions and outcomes within the real estate market and provides an overview of the legal and regulatory considerations relevant to the use of AI in real estate due diligence.

**Chapter Three** assesses the potential benefits and drawbacks of using AI in real estate transactions. It explores the geopolitical context and the regulatory environment that governs AI technologies. The chapter looks ahead to future trends in AI and their potential legal implications for the real estate sector.

**Chapter Four** discusses the importance of managing privacy when implementing AI systems in real estate. It explores the concept of "cybernetics of law" and how it applies to AI-driven processes in real estate. The chapter presents practical case studies that illustrate the legal challenges and solutions associated with AI-driven due diligence in real estate.

The thesis concludes that while AI offers significant opportunities to enhance due diligence in real estate investments, it also brings about complex legal challenges that must be carefully managed. Ensuring compliance with existing laws, prioritizing transparency, and adopting robust cybersecurity measures are crucial steps for real estate companies. A balanced approach that integrates technological innovation with rigorous legal oversight is essential for fostering a sustainable and legally sound real estate market.

## **BIBLIOGRAPHY**

Article 1 GDPR.

Article 2 GDPR.

Article 29, WP, 2017.

Article 51(1) GDPR.

Article 55(1) GDPR.

Article 56(3) and (5) GDPR.

Article 56(2) GDPR.

Article 56(6), GDPR.

Article 83, GDPR.

Bassoli E., (2018) The new GDPR privacy after the Legislative Decree 10 August 2018, no. 101, Dike Giuridica, 2018, p. 123.

Bottazzi G., Secchi A. (2011). A new class of asymmetric exponential power densities with applications to economics and finance, *Industrial and Corporate Change*, Volume 20, Issue 4.

CBRE Research Italy (2021) - Real Estate Market Outlook. CBRE Research Italy, March 2021. [http://cbre.vo.llnwd.net/grgservices/secure/ITA\\_Outlook%202021%20Italy\\_DEF.pdf?e=1631469390&h=d4273e9e66ded06020a8e4ed6d76c249](http://cbre.vo.llnwd.net/grgservices/secure/ITA_Outlook%202021%20Italy_DEF.pdf?e=1631469390&h=d4273e9e66ded06020a8e4ed6d76c249)

D'Arienzo M. C., (2015) I nuovi scenari della tutela della privacy nell'era della digitalizzazione alla luce delle recenti pronunce sul diritto all'oblio, in *Federalismi.it*, 29 May, 8 ff.

Demyanyk, Y., Van Hemert O., (2011). *The Review of Financial Studies*, Volume 24, Issue 6, 1 June 2011, pp. 1848-1880.

Duke, J.V., Popoyan L., Watcher S.M., (2016). *Real Estate and the Great Crisis: lessons from Macro-Prudential Policy*, LEM Working Paper Series.

Favilukis, J, Ludvingson J., Van Nieuwerburg S., (2017). 'The macroeconomic effect of housing wealth housing finance and limited risk sharing in general equilibrium', *Journal of Political Economy*, Vol. 125, No. 1.

Fuster G., (2014) *The Emergence of Personal Data Protection as a Fundamental Right*, Springer, pp. 164-166

Gellman R., (2017) *Fair Information Practices: A Basic History*, Cornell University Press, pp. 104-114.

Goddard M., (2017) *The EU General Data Protection Regulation (GDPR): European regulation that has a global impact*, *International Journal of Market Research* Vol. 59 Issue 6.

Haughwout, A., Lee D., Tracy J., van der Klaauw W., (2011). Real estate investors, the leverage cycle and the housing market crisis, Federal Reserve Bank of New York Staff Reports, no. 514.

Justiniano, A, Primiceri J.E., Tambalotti A. (2015). Credit Supply and the Housing Boom, Federal Reserve Bank of New York, Staff Report No. 709.

Koops B. J., B. Newell, T. Timan, I. Škorvánek, T. Chokrevski, M. Galič, A (2017) Typology of Privacy, University of Pennsylvania Journal of International Law, pp. 87-93.

Riccio G. M., G. Scorza, E. Belisaro, (2022) GDPR and privacy law. Commentary, 2nd ed., Wolters Kluwer, Ipsa, pp. 41-50.

Schwartz P. M., D. J. Solve, (2019) Information privacy concerns the collection, use and disclosure of personal information, Aspen, pp. 101-120.

<https://powerpatent.com/blog/the-role-of-ai-in-real-estate-law-analysis>

[https://www.europarl.europa.eu/RegData/etudes/STUD/2020/641530/EPRS\\_STU\(2020\)641530\\_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/STUD/2020/641530/EPRS_STU(2020)641530_EN.pdf)

<https://www.jll.it/it/tendenze-e-ricerca/research/artificial-intelligence-and-its-implications-for-real-estate>

<https://www.mckinsey.com/industries/real-estate/our-insights/generative-ai-can-change-real-estate-but-the-industry-must-change-to-reap-the-benefits>

<https://www.fool.com/investing/stock-market/market-sectors/information-technology/ai-stocks/ai-in-real-estate/>

<https://www.leewayhertz.com/ai-in-real-estate/>

<https://www.dealmachine.com/blog/ai-real-estate>

<https://radixweb.com/blog/ai-in-real-estate-industry>

<https://www.ansarada.com/due-diligence/ai>

[https://www.ey.com/en\\_ch/strategy-transactions/how-ai-will-impact-due-diligence-in-m-and-a-transactions](https://www.ey.com/en_ch/strategy-transactions/how-ai-will-impact-due-diligence-in-m-and-a-transactions)

<https://www.traverssmith.com/media/6382/how-ai-is-changing-legal-due-diligence.pdf>

<https://www.oecd-ilibrary.org/sites/31e7edcc-en/index.html?itemId=/content/component/31e7edcc-en>

ACPR (2020), Governance of Artificial Intelligence in Finance, Disponibile su: <https://acpr.banque-france.fr/en/governance-artificial-intelligence-finance> (consultato il 27/05/2024)

BaFin (2018), Big data meets artificial intelligence: challenges and implication for the supervision and regulation of financial services, Disponibile su: [www.bafin.de](http://www.bafin.de). (consultato il 26/05/2024)

Bassini M., Liguori L., Pollicino O., (2018) Sistemi di Intelligenza Artificiale, responsabilità e accountability. Verso nuovi paradigmi? in F. Pizzetti, Intelligenza artificiale, protezione dei dati personali e regolazione, Torino, pp. 342 ss.

Blackrock (2019), Artificial intelligence and machine learning in asset management background,

Disponibile su: <https://www.blackrock.com/corporate/literature/whitepaper/viewpoint-artificial-intelligencemachine-learning-asset-management-october-2019.pdf> (consultato il 27/05/2024)

Carbone M.R., Longo A., (2021) Ecco il Regolamento UE sull'intelligenza artificiale, sul percorso del GDPR, 21 aprile, in [www.cybersecurity360.it](http://www.cybersecurity360.it).

CONSOB (2022), L'intelligenza artificiale nell'asset e nel wealth management, 9 giugno 2022.

Cristallini A., (2021) La crucialità della governance dell'intelligenza artificiale come nuovo strumento di politica estera dell'Unione europea, 20 luglio, in [www.filodiritto.it](http://www.filodiritto.it).

Ferrarese M.G., (2006) Diritto sconfinato. Inventiva giuridica e Spazi nel mondo globale, Roma-Bari, spec. 99.

Financial Stability Board (2017), Artificial Intelligence and Machine Learning in Financial Services, Disponibile su: <http://www.fsb.org/2017/11/artificial-intelligence-andmachine-learning-in-financial-service> (consultato il 26/05/2024)

Franke U., (2021) Artificial Intelligence diplomacy | Artificial Intelligence governance as a new European Union external policy tool, Study for the special committee on Artificial Intelligence in a Digital Age (AIDA), Policy Department for Economic, Scientific and Quality of Life Policies, European Parliament.

Libro bianco sull'intelligenza artificiale - Un approccio europeo all'eccellenza e alla fiducia, in [https://ec.europa.eu/info/sites/default/files/commission-white-paper-artificial-intelligence-feb2020\\_it.pdf](https://ec.europa.eu/info/sites/default/files/commission-white-paper-artificial-intelligence-feb2020_it.pdf), p. 11

Nourani, M., Kabir, S., Mohseni, S. e Ragan, E.D. (2020), The Effects of Meaningful and Meaningless Explanations on Trust and Perceived System Accuracy in Intelligent Systems, <http://www.aaai.org>.

OECD (2015), Data-Driven Innovation: Big data for growth and well-being, OECD Publishing, Paris, <https://dx.doi.org/10.1787/9789264229358-en>.

Onukwugha, E. (2016), Big Data and Its Role in Health Economics and Outcomes Research: A Collection of Perspectives on Data Sources, Measurement, and Analysis, *PharmacoEconomics* 34, 91–93, <https://doi.org/10.1007/s40273-015-0378-4>.

Pagallo U., (2017) Intelligenza Artificiale e diritto. Linee guida per un oculato intervento normativo, in *Sistemi intelligenti*, 3.

Piva, A. (2019), Le 5V dei Big data: dal volume al valore, Disponibile su: [www.osservatori.net](http://www.osservatori.net) (consultato il 27/05/2024)

Rossi F., (2017) Intelligenza Artificiale benefica e sicura: iniziative accademiche, governative e industriali, in *Sistemi intelligenti*, 3, p. 81.

Wagner D. (2020), The nature of the Artificially Intelligent Firm - An economic investigation into changes that AI brings to the firm, *Telecommunications Policy*, 44, 101954.

Walch, A. (2015), The Bitcoin Blockchain as Financial Market Infrastructure: a consideration of operational risk, *18 NYU Journal of Legislation and Public Policy*, 856 e ss., <https://ssrn.com/abstract=2579482>