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# The Legal Regime Governing E-Commerce Transactions in the Age of Artificial Intelligence: Opportunities and Challenges

**Dr. Messafah Fatma**[1]
[1]Lecturer Class A, Lounisi Ali University - Blida2, Laboratory for Digitalization and Law, Algeria, E-mail: **f.messafah@univ-blida2.dz**

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**ABSTRACT**

This study aimed to examine the structural transformations induced by Artificial Intelligence (AI) technologies across commercial and financial institutions, while analyzing the legal and regulatory challenges emerging from their operational deployment. Methodologically, the study employed a descriptive-analytical approach to assess the impact of machine learning algorithms and artificial neural networks on operational competitiveness, combined with a legal-analytical framework to evaluate the adequacy of current legislation regarding autonomous decision-making.

The findings indicate that while AI significantly reduces operational costs and enhances customer experiences, its implementation creates a regulatory gap, as traditional legal rules struggle to address algorithmic accountability, procedural transparency, and data privacy. The study concludes that sustainable AI integration requires adaptive, responsive governance frameworks capable of balancing digital innovation and investment promotion with the protection of fundamental rights and legal certainty.

**Keywords:** Artificial Intelligence, Commercial and Financial Institutions Algorithmic Governance, Automated Decision-Making, Legal Certainty, Data Privacy.

## Introduction:

The contemporary global economy has witnessed an accelerated structural transformation driven by the Fourth Industrial Revolution, where artificial intelligence

applications have transcended their traditional role as technical operational aids to become a strategic engine reshaping business models and framing institutional and developmental policies. The advanced development of machine learning algorithms and artificial neural networks has provided commercial and financial institutions with unprecedented capabilities to process large unstructured datasets, predict market trends, and deliver customized products that enhance companies' competitive advantage at both domestic and international levels[1].

Importance of the study and justifications: In light of the accelerating digital transformation and intensifying international competition, integrating artificial intelligence technologies has become an imperative necessity to ensure operational sustainability and generate added value. This is clearly manifested in vital sectors such as banks and financial institutions, cross-border e-commerce platforms, and supply chain and logistics management; these intelligent solutions contribute to reducing operational costs, automating complex processes, and improving customer experience through immediate responsiveness to market demands[2].

Despite the tangible economic and competitive gains, the expansion in adopting these technologies raises a highly complex regulatory and legal gap, evident in the extent to which classical legal rules can accommodate the particularities of self-operating AI systems. The core dilemma revolves around how to subject automated decision-making to the principles of transparency and accountability, ensure data security, and protect the right to privacy, without constraining the movement of innovation and digital investment[3]. Accordingly, the research problem is defined by the following question:

To what extent do existing legislative and regulatory frameworks respond to the governance challenges of artificial intelligence technologies in commercial and financial institutions, in a manner that balances stimulating innovation with preserving legal certainty and fundamental rights?

[1] Jain, A. (2019). Artificial Intelligence in Business: Operational Efficiency and Strategic Growth. Journal of Business & Technology, 14(2), 45–58.
[2] Alekseeva, L., Azar, J., Gine, M., Samila, S., & Taska, B. (2020). The Demand for AI Skills in the Labor Market. Journal of Financial Economics, 137(1), 120–139.
[3] European Commission. (2020). Report on Artificial Intelligence in Daily Life: Impacts on Fundamental Rights. Brussels: Publications Office of the European Union.

This study aims to deconstruct the economic and competitive impact of artificial intelligence technologies in the financial and commercial sectors, and to identify and analyze the legal and regulatory gaps resulting from automated decision-making.

The study relies on the descriptive-analytical method to unpack the operational and economic dimensions of artificial intelligence and analyze their institutional repercussions.

I analyze the topic in the following two sections:

**Section One:** Areas of application of artificial intelligence in commercial and financial transactions

**Section Two:** Legal, regulatory effects and ethical challenges

## Section One: Areas of application of artificial intelligence in commercial and financial transactions

The shift toward intelligent systems represents a fundamental pillar in restructuring the contemporary business environment; artificial intelligence has moved from being an auxiliary tool to an operational and strategic driver that redefines mechanisms of commercial and financial exchange. The importance of this section lies in tracing the dimensions of employing advanced algorithms in the joints of the real and digital economy, following how they enhance efficiency, reduce costs, and improve decision-making. Accordingly, this section aims to elucidate the most prominent manifestations of this technological penetration by dividing it into two main axes; the first addresses its applications in the trade sector and supply chains, while the second is devoted to analyzing its role in banking transactions and financial markets. I analyze the topic through the following points:

- The legal regulation of e-commerce and its technical applications
- Artificial intelligence in corporate governance and supply chain regulation
- Digitization of banking operations and commercial banks

### Requirement One: The legal regulation of e-commerce and its technical applications

This requirement addresses the legislative framework governing digital commercial transactions, reviewing the international legal regulation of e-commerce, the position of the

Algerian legislator, and the technical applications of e-commerce — electronic marketing in the age of artificial intelligence.

**Branch One: International legal regulation of e-commerce**

E-commerce constitutes a fertile environment for artificial intelligence applications and is subject to international and national legal framing that ensures the integrity of transactions[4].

The international legal regulation of e-commerce is represented as follows:

1. **UNCITRAL Model Law on Electronic Commerce (1996):** The United Nations Commission on International Trade Law approved a uniform law for electronic commerce on 16 December 1996, focusing on "electronic information exchange," the evidentiary value of documents and electronic signatures, and the harmonization of international rules.
2. **World Trade Organization (WTO):** Issued a comprehensive study in 1995 and considered e-commerce a commercial activity governed by the three main international agreements (GATT for goods, GATS for services, and TRIPS for intellectual property).
3. **North American Free Trade Agreement (NAFTA):** Established expert frameworks to prepare unified legal rules for e-commerce and joint digital investment.
4. **International Chamber of Commerce (ICC):** Contributed to setting data protection standards and Incoterms rules to define the responsibilities of parties in international sales and provided digital arbitration services for dispute resolution.

**Branch Two: The position of the Algerian legislator and technical applications of e-commerce**

The Algerian legislator regulated e-commerce under **Law No. 18-05**, specifying the scope of application, conditions for the validity of electronic contracts, suppliers' obligations to protect consumers (providing clear information and measures for returning goods), and criminal penalties to combat cybercrimes and fraud[5].

Among the most prominent artificial intelligence techniques supporting e-commerce are:

[4] United Nations Commission on International Trade Law (UNCITRAL). (1996). UNCITRAL Model Law on Electronic Commerce with Guide to Enactment.
[5] Law No. 18-05 on Electronic Commerce in Algeria (scope, electronic contracts, and consumer protection).

1. Visual Search: Using machine learning to search for products by images (such as applications on the Temu platform).
2. Persistent chatbots (e.g., Alexa): Providing immediate 24/7 responses via natural language processing.
3. Fraud detection: Monitoring suspicious financial and personal behaviors and protecting merchants.
4. Task automation (e.g., IFTTT): Orchestrating order workflows and customer service with precise timing.
5. Targeted advertising: Directing ads based on analysis of behavior, age, and geographic location.

**Branch Three: Electronic marketing in the age of artificial intelligence**

Electronic marketing is one of the commercial fields most affected and intersected with artificial intelligence techniques. To frame this field legally and technically, it is necessary to examine comparative and national legislative frameworks, then identify the newly introduced techniques and applications[6] through the two branches below:

Branch One: The Legislative Framework for Electronic Marketing

Branch Two: Newly Introduced Intelligent Applications in Electronic Marketing

**First: The Legislative Framework for Electronic Marketing**

Many European legislations have addressed electronic marketing and the protection of online consumers directly and indirectly, among the most important of which are:

1. **The European E-Commerce Directive:** It defines the general legal framework for online transactions, focusing on transparency in digital advertising, consumer protection, and the duty to disclose the supplier's identity.
2. **The General Data Protection Regulation (GDPR):** It regulates how consumers' personal data are collected and processed in marketing activities, imposing the requirement of explicit consent and the application of privacy-by-design principles.

[6] General Data Protection Regulation (GDPR), Regulation (EU) 2016/679 of the European Parliament and of the Council.

3. **The ePrivacy Directive:** It deals with the privacy of digital communications, email marketing, the use of cookies, and tracking.

4. **The European directives on consumer rights and unfair commercial practices:** They aim to protect consumer rights and to prevent misleading or deceptive advertising and unfair marketing tactics.

5. **As for the Algerian legislator:** We note that the Algerian legislator did not provide an explicit and direct legal definition of the term "electronic marketing" within a specific statutory text; however, this concept is implicitly understood from the provisions of **Law No. 18-05** dated 10 May 2018 concerning electronic commerce. Article 6 of Law 18-05 states: "Electronic advertising means any advertisement that aims directly or indirectly to promote the sale of goods or services by means of electronic communications." [7]

Although this article uses the term "electronic advertising," the definition covers a substantial aspect of online marketing activities. The concept of electronic marketing is broader than advertising, as it is not limited to mere promotion and advertisement but extends to studying and identifying the needs of target markets, analyzing consumer behavior, managing customer relationships, and employing advanced digital technologies to activate marketing productivity[8].

**Second: Newly Introduced Intelligent Applications in Electronic Marketing**

Artificial intelligence technologies have produced a qualitative leap in marketing tools, and among the most prominent of these applications are:

1. **Automated chatbots and Natural Language Processing (NLP):**

These applications have evolved through machine learning research to become capable of understanding human language and conducting interactive real-time conversations. Such bots are used to provide round-the-clock (24/7) support, answer inquiries, and collect customer data. Voice and image sentiment-analysis techniques have also emerged to assist human sales representatives during calls. A practical example is the automated response and order-completion system used by Domino's Pizza. The legal challenge lies in the extent to

[7] Law No. 18-05 of 24 Sha'ban 1439 AH, corresponding to 10 May 2018, on Electronic Commerce, Official Gazette of the People's Democratic Republic of Algeria, No. 28, issued on 16 May 2018.
[8] Article 6 of Law No. 18-05, defining electronic advertising and regulating the promotion of goods and services remotely.

which customers feel comfortable with and consent to the monitoring of their conversations or interacting with automated entities without prior disclosure[9].

2. **Blockchain technology and the prohibition of cryptocurrencies:**

Blockchain is one of the influential digital innovations that provides an immutable digital ledger to track products, eliminate advertising fraud, and execute smart contracts. Under Algerian legislation, a clear distinction must be made between using blockchain as a ledger technology and dealing in cryptocurrencies; Article 117 of Law No. 17-11, which includes the Finance Law for 2018, prohibited all forms of dealing in cryptocurrencies (banning purchase, sale, or use for payment of goods and services)[10].

3. **Generative AI models (ChatGPT):**

Large language models contribute to developing marketing strategies, selecting the most appropriate channels, analyzing performance analytics in real time, and conducting precise competitor analysis using a SWOT matrix (Strengths, Weaknesses, Opportunities, Threats).

4. **Personalized recommendation systems (Amazon & Netflix):**

Amazon relies on artificial intelligence to provide personalized recommendations based on purchase history, while Netflix uses algorithms to suggest viewing content according to user preferences.

**Requirement Two: Artificial Intelligence in Corporate Governance and Supply Chain Regulation**

In this requirement I will study corporate governance, electronic incorporation and disclosure, and the management of supply chains and logistics.

**Branch One: Corporate Governance, Electronic Incorporation, and Disclosure**

Transparency and disclosure are pillars of corporate governance, especially for joint-stock companies listed on the stock exchange. The Algerian legislator, when establishing a joint-stock company through a public subscription of savings, required the publication of a subscription announcement pursuant to Article 595, paragraph 2 of the Commercial Code,

[9] Surve, S. (2020). Impact of Artificial Intelligence on Recruitment and Selection Process. International Journal of Human Resource Management, 8(3), 12–25.
[10] Article 117 of Law No. 17-11 of 27 December 2017, containing the Finance Law for 2018 (prohibition of transactions involving cryptocurrencies in Algeria).

which referred to Executive Decree No. 95-438 for publication in the Official Gazette of Legal Announcements (ALBO)[11].

Supporting the digital transformation process, Law No. 13-06 amending Law No. 04-08 concerning the conditions for practicing commercial activities authorized registration in the commercial register and issuance of the register electronically, which was implemented by Executive Decree No. 15-111 via the electronic portal (SIDJILCOM commercial register).

This transformation constitutes the infrastructure necessary for adopting artificial intelligence systems to enhance the board's work, automate compliance, design performance-based executive compensation systems, facilitate shareholder participation through smart electronic voting platforms, and improve the transparency of financial reporting[12].

**Branch Two: Management of Supply Chains and Logistics**

Supply chain management consists of managing the flow of goods, services, and information from origin to consumer. Under Algerian legislation, the legal framework for supply chains is distributed among multiple texts, most notably: the Commercial Code, public procurement law, customs and transport laws, and competition law[13].

The technical uses of artificial intelligence in the supply chain vary to include:

1. Process automation (RPA & IPA): Managing back-office tasks and executing repetitive processes.
2. Sourcing and warehousing: Reducing inventory dwell time in warehouses by up to 30% through demand forecasting. Global field cases include:

[11] Article 595(2) of the Algerian Commercial Code, Ordinance No. 75-59 of 20 September 1975 establishing the Algerian Commercial Code, as amended and supplemented by Law No. 22-09 of 5 May 2022, Official Gazette, No. 32, issued on 18 May 2022; and Executive Decree No. 95-438 of 25 November 1995 concerning the implementation of the provisions of the Commercial Code relating to joint-stock companies and economic groupings, Official Gazette of the People's Democratic Republic of Algeria, No. 80, issued on 27 December 1995.
[12] Law No. 13-06 amending Law No. 04-08 concerning the conditions for the exercise of commercial activities, as amended by Law No. 18-08 of 10 June 2018, amending and supplementing Law No. 04-08 of 14 August 2004 concerning the conditions for the exercise of commercial activities, Official Gazette of the People's Democratic Republic of Algeria, No. 36, issued on 20 June 2018.
[13] Ordinance No. 75-59 of 20 September 1975 establishing the Algerian Commercial Code, as amended and supplemented by Law No. 22-09 of 5 May 2022, as referred to above; and Presidential Decree No. 15-247 concerning public procurement, as amended by Law No. 23-12 of 18 August 2023, establishing the general rules relating to public procurement, Official Gazette of the People's Democratic Republic of Algeria, No. 51, issued on 10 August 2023.

- Amazon: Implementing automated forecasting systems and using mobile Kiva robots that increased storage speed by more than 40%, operating 253 fulfillment centers and 110 sortation centers in the United States, plus 157 fulfillment centers and 58 sortation centers worldwide, with shipping options (FBA) and (FBM).
- Walmart: Determining appropriate quantities based on seasonal consumer behavior to reduce costs.
- Zara: Analyzing field sales data to shorten production and distribution cycles.

3. Distribution and Delivery: improving delivery routes, drones (Amazon Prime Air and UPS), and self-driving trucks in collaboration between Volvo and DHL.

**Requirement Three: Digitization of Banking Operations and Commercial Banks**

This requirement reviews the digital transformation in the banking sector and its repercussions on the mechanisms for providing modern financial services and products in two branches:

Branch One: The Legislative Framework for Digitizing the Algerian Banking Sector.

Branch Two: The Impact of Artificial Intelligence on Banking Performance and Applications.

Branch Three: Safeguards, Regulatory Requirements, and Precautionary Measures in the Banking Sector.

**Branch One: The Legislative Framework for Digitizing the Algerian Banking Sector.**

The Algerian legislator adopted a strict, qualitative, and systemic approach to digitizing the banking sector under the Monetary and Banking Law No. 23-09 issued in June 2023. The most prominent features of this law include:

1. Recognition of digital banks: Allowing the establishment of fully Algerian national digital banks to strengthen financial digital sovereignty.
2. Introduction of the Algerian digital dinar: Provision for developing a national digital currency to be issued, managed, and supervised by the Bank of Algeria.
3. Expansion of the powers of the Monetary and Credit Council: Granting it authority to approve digital banks and electronic payment service providers.

4. Regulatory instructions of the Bank of Algeria (March 2025): Issuance of detailed instructions specifying the licensing conditions and approval procedures for digital banks.

**Branch Two: The Impact of Artificial Intelligence on Banking Performance and Applications**

The use of artificial intelligence systems has led to the automation of routine processes, a reduction in banking transaction processing times by approximately 30%, enhancement of customer service quality around the clock via chatbots, and the availability of automated reports drafted in natural language[14].

The most important advanced banking applications are:

1. Anti-Money Laundering (AML) and Know Your Customer (KYC): The shift from rule-based systems to intelligent systems capable of detecting complex patterns of financial crime.

2. Prediction of financial risk and bankruptcy: Using machine learning algorithms such as the Boosted Trees model to classify loans to small and medium enterprises based on 50 critical variables, and employing Neural Networks and Random Forests to predict and impute missing values[15].

3. Asset management and robo-advisors: Providing personalized investment advice and portfolio rebalancing, a model applied in Wall Street markets in the United States since 2008.

4. Credit underwriting and detection of banking fraud: Rapid assessment of creditworthiness by analyzing phone and transaction data in real time and automatically freezing suspicious transactions[16].

**Branch Three: Safeguards, Regulatory Requirements, and Precautionary Measures in the Banking Sector**

[14] Monetary and Banking Law No. 23-09, enacted in June 2023 (including provisions concerning authorization of digital banks, the introduction of the Algerian digital dinar, and the powers of the Monetary and Credit Council), and the instructions of the Bank of Algeria. Law No. 23-09 of 21 June 2023 establishing the Monetary and Banking Law, Official Gazette of the People's Democratic Republic of Algeria, No. 43, issued on 27 June 2023.
[15] Biliavska, O., et al. (2022). Predictive Analytics in Human Resource Management and Strategic Decision Making. Strategic Management Review, 15(1), 130–145.
[16] European Banking Authority (EBA). (2020). Report on the Use of Big Data and Advanced Analytics in the Banking Sector. London: EBA Publications.

Smart banking transactions are subject to strict safeguards that include: ensuring data quality in accordance with European consumer and mortgage credit directives and MiFID II; adherence to Basel Committee guidelines for risk data aggregation; and compliance with the European Banking Authority report (EBA 2020) on artificial intelligence and advanced analytics. Precautionary rules also require obtaining regulatory approval before adopting internal models, and compliance with detailed rules on remuneration caps and leadership governance under the Capital Requirements Directive (CRD IV) to avoid operational and cyber risks[17].

**Section Two: Legal, Regulatory Effects and Ethical Challenges**

The rapid expansion in employing artificial intelligence has imposed structural challenges that affect the stability of the legislative system; the autonomy of algorithmic decision-making reveals the inadequacy of traditional rules to absorb developments in civil liability and transparency. The issue becomes more acute where automation intersects with fundamental rights, such as personal data protection and algorithmic fairness, raising ethical dilemmas concerning bias and automated surveillance. Accordingly, this section aims to unpack these problems by identifying existing legal and regulatory gaps, then reviewing the ethical stakes and the legislator's efforts to draft governance frameworks that balance encouraging innovation with ensuring legal security.

Requirement One: Positive Effects and Field Economic Outcomes

Requirement Two: Legal Challenges, Regulatory Problems, and Ethical Issues

**Requirement One: Positive Effects and Field Economic Outcomes**

Adopting artificial intelligence achieves substantial benefits including increased productivity, automation of routine tasks, elimination of hazardous work, provision of medical care and accurate diagnosis, personalization of user experience, and crisis prediction[18].

**Branch One: The Impact of Artificial Intelligence on the Strategic Performance of Human Resources**

[17] Capital Requirements Directive (CRD IV) and Basel Committee rules concerning risk data aggregation and financial reporting.

[18] Babina, T., Fedyk, A., He, A., & Hodson, J. (2021). Artificial Intelligence, Firm Growth, and Industry Concentration. NBER Working Paper No. w28905.

Artificial intelligence has produced a qualitative shift in recruitment by automating communication and fair screening and by analyzing candidate files without human biases. Predictive algorithms also enable institutions to make complex strategic decisions and to design tailored training and development programs to fill skill gaps[19].

**Branch Two: Results of Global Experimental and Academic Studies**

The economic and regulatory impact of artificial intelligence goes beyond merely facilitating administrative operations to effecting a structural transformation in business models (Business Model Transformation). Rather than a traditional separate narration of field results, consistent scientific analysis of global experimental and academic research shows that the impact of smart technologies crystallizes across three analytical dimensions and integrated strategic drivers:

1. **First dimension: Drivers of financial growth, profits, and capital allocation structure**

The literature in financial economics based on quantitative data demonstrates that integrating artificial intelligence technologies is directly associated with improvements in vital financial performance indicators[20] in American companies. There is a statistically significant positive relationship between investment directed toward AI skills and increases in sales growth rates, expansion of capital expenditures (CapEx), and improvement in earnings before interest, taxes, depreciation, and amortization (EBIT).

This growth is attributed to algorithms' ability to reduce operating costs and improve demand-forecasting accuracy. In the same context, analysis issued by the National Bureau of Economic Research[21] confirms that strategic investment in artificial intelligence is not merely a tool for cost rationalization but represents a financial lever that enhances firms' overall market value and grants them sustainable competitive advantages reflected in their valuations in financial markets.

**2. The Second Dimension: Innovative Innovation and Dynamic Organizational Capabilities**

[19] Gupta, S., & Mikalef, P. (2021). Enterprise AI Capabilities and Organizational Creativity. Information & Management, 58(3), 103426.
[20] Alekseeva et al. (2020), pp. 124–128.
[21] Babina et al. (2021), pp. 18–22.

Organizational analysis indicates that artificial intelligence functions as a General Purpose Technology that stimulates open innovation and the continuous development of products and services. In this regard, theoretical analysis has shown that an organization's possession of AI capabilities enhances its organizational agility and supports an institutional climate of creativity, enabling rapid readaptation to digital environmental shifts[22]. This finding aligns with a field study[23] in emerging market environments in India, which demonstrated that adopting intelligent algorithms grants organizations a high capacity to absorb technological shocks and overcome infrastructure obstacles by improving process automation and linking commercial strategies to tightly controlled field execution.

**3. The Third Dimension: Restructuring Human Capital and Qualitative Productivity**

Contrary to the common narrative that links automation to the complete displacement of labor, academic analysis yields the concept of Human Capital Augmentation. Results from the field executive survey published by[24] the *Harvard Business Review* show that 54% of executive leaders perceive a direct and tangible increase in their organizations' productivity following the introduction of AI tools, while 72% affirmed that these technologies allowed the redeployment of human resources toward high-value strategic tasks and left routine tasks to automated systems.

Moreover 61% of leaders reported discovering previously overlooked investment and future opportunities, and 80% expressed the conviction that artificial intelligence contributes to creating new and higher-quality jobs. These findings support the view that predictive algorithms effect a strategic transformation in human resource management, from neutral talent acquisition and performance analysis to designing specialized training programs and retaining highly competent personnel.

**Requirement Two: Legal Challenges, Regulatory Problems, and Ethical Issues**

Against the substantial benefits, integrating artificial intelligence faces highly complex legal and ethical challenges[25]. I address these through the main legal and regulatory problems (Branch One), the six ethical principles for regulating artificial intelligence (Branch Two), and (Branch Three) an analysis of the six governing ethical pillars for AI systems.

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[22] Gupta & Mikalef (2021), p. 103426.
[23] Jain (2019), pp. 48–52.
[24] Zapanta, Harvard Business School Publishing (2020), pp. 78–81.
[25] Zapanta, T. (2020). AI and Executive Leadership: Transforming Business Productivity. Harvard Business Review Supply Report.

**Branch One: Main Legal and Regulatory Problems**

These problems consist of:

1. **Lack of transparency and the Black Box Problem**

Neural networks often lack the ability to clarify the precise logic of automated decisions, which conflicts with principles of procedural fairness and the right to accountability and to challenge administrative, medical, and financial decisions.

2. **Biased algorithms and the entrenchment of discrimination**

Training algorithms on historically biased data leads to the reproduction of discrimination—victims of "automation bias"—which contravenes principles of equality before the law.

3. **Ambiguity of legal liability (contractual and tortious)**

Independent decisions resulting from self-learning raise the problem of identifying the responsible party (the developer, the owner, or the operator). This issue became evident in the famous case *Loomis v. Wisconsin* (2016), where the COMPAS criminal risk-assessment algorithm was challenged, prompting the European Parliament's report on civil liability for artificial intelligence[26].

4. **Erosion and contraction of privacy**

Artificial intelligence requires collecting and analyzing vast amounts of personal data. Alongside the European General Data Protection Regulation (GDPR), Algerian legislation in Law No. 18-07 on the protection of natural persons with regard to the processing of personal data enshrines principles of transparency and explicit consent to protect individuals' privacy[27].

5. **Digital monopoly and the influence of major corporations**

Large technology firms (Microsoft, Google, Apple, Amazon, Alibaba, Tencent, Baidu) exert extensive influence that entrenches the phenomenon of "digital monopoly" and the "winner-takes-all" dynamic, benefiting from **transfer learning** techniques.

6. **Effects on the labor market and erosion of human skills**

[26] Loomis v. Wisconsin, 881 N.W.2d 749 (Wis. 2016), concerning the assessment of the COMPAS algorithm, and the European Parliament report on civil liability for artificial intelligence.
[27] Law No. 18-07 of 10 June 2018 concerning the protection of natural persons with regard to the processing of personal data, Official Gazette of the People's Democratic Republic of Algeria, No. 34, issued on 10 June 2018.

The expansion of automation exerts pressure on jobs and erodes human creative and analytical capacities that rely on computation and mental reasoning.

**Branch Two: The Six Ethical Principles for Regulating Artificial Intelligence**

The six ethical principles for regulating artificial intelligence—algorithmic fairness, accountability and responsibility, transparency, technical explainability, safety and human control, and alignment with international standards—constitute the most important pillars of sound governance that seek to bridge the gap between technological acceleration and the protection of fundamental human rights. The analytical coherence of these principles is evident in their evolution from flexible guiding recommendations to binding regulatory frameworks aimed at dispelling the risks of the Black Box and algorithmic bias[28].

Human control and technical transparency form the first line of defense to ensure individual security and to determine contractual and tortious liability of designers and implementers, while the requirements of fairness and explainability prevent algorithmic discrimination and facilitate societal understanding of automated logic. Thus, this ethical system embodies the growing international consensus on making artificial intelligence a Trustworthy AI that preserves human dignity and sovereignty over consequential automated decisions in commercial and financial transactions[29].

**Branch Three: Analysis of the Six Governing Ethical Pillars for AI Systems**

Codifying artificial intelligence in digital transactions represents a challenge that balances driving innovation and protecting the fundamental rights and data of stakeholders.

The value-based and ethical framing of AI technologies within digital transactions and the banking sector rests on an integrated package of six core principles aimed at finding a precise balance between encouraging technological development and safeguarding users' fundamental rights, which are as follows:

[28] European Union. (2024). Regulation (EU) 2024/1689 of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act). Official Journal of the European Union, L 2024/1689, Articles 5–14, pp. 1–144.

[29] High-Level Expert Group on Artificial Intelligence. (2019). Ethics Guidelines for Trustworthy AI. European Commission, Directorate-General for Communications Networks, Content and Technology, pp. 1–41. Publications Office of the European Union. https://doi.org/10.2759/346720

1. Equity and Algorithmic Fairness: verifying the accuracy and comprehensiveness of the data relied upon to prevent hidden or indirect discrimination arising from biased historical records, and subjecting systems to proactive evaluation to detect any deviation in their algorithmic outputs[30].

2. Accountability and Possibility of Redress (Accountability) : Obliging developers and operators of these systems to bear the legal and ethical consequences, with the involvement of multidisciplinary teams and workforces, and providing clear channels for administrative and judicial dispute and appeal against automated decisions[31] (European Union, 2024, Art. 14).

3. Transparency and Clarity (Transparency) : Providing an audit trail that enables tracing operations and analyzing causes of malfunctions, alongside informing users explicitly and in advance about the nature of the intelligent processing of their data and about pivotal decisions issued by automated systems[32].

4. Technical Explanation and Clarification (Explainability) : Overcoming the "Black Box" problem by translating complex algorithmic mechanisms and decisions into simplified, comprehensible explanations for all segments of society and users[33].

5. Safety and Effective Human Oversight (Safety & Human Control) : Prioritizing individual safety and the resilience of cyber infrastructure above other considerations, while technically enabling human experts to intervene directly to stop the system or overturn its outputs through an emergency stop mechanism (Kill Switch)[34].

6. Compliance with International Norms and Charters (Compliance with International Standards): Respecting human dignity, human values, and general human rights, thereby ensuring the primacy and autonomy of the human element in directing its course and shaping vital economic decisions.

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[30] High-Level Expert Group on Artificial Intelligence [HLEG]. (2019). Ethics Guidelines for Trustworthy AI. European Commission, Directorate-General for Communications Networks, Content and Technology, p. 12. Publications Office of the European Union. https://doi.org/10.2759/346720

[31] European Union. (2024). Regulation (EU) 2024/1689 of the European Parliament and of the Council Laying Down Harmonised Rules on Artificial Intelligence (Artificial Intelligence Act). Official Journal of the European Union, L 2024/1689, Articles 5–14.

[32] European Commission. (2021). Artificial Intelligence in Daily Life: Impacts on Fundamental Rights and Data Protection. Publications Office of the European Union.

[33] High-Level Expert Group on Artificial Intelligence [HLEG]. (2019). Ethics Guidelines for Trustworthy AI. European Commission, Directorate-General for Communications Networks, Content and Technology, p. 13. Publications Office of the European Union. https://doi.org/10.2759/346720

[34] European Union (2024), Art. 14.

## Conclusion

We conclude that electronic commercial transactions in the age of artificial intelligence provide an entry point for analyzing the interaction between the emerging technological revolution and current legislative texts; the study has shown that the shift toward intelligent automation is no longer merely an operational option but has become a structural determinant of market rules and the roles of economic actors.

Based on the conducted analysis, this study reached the following findings:

- Operational enhancement and customer experience: Data demonstrate the pivotal role of artificial intelligence in raising the quality of digital services through personalized offers and instantaneous support, which strengthened consumer trust and loyalty in e-commerce environments.
- Efficiency improvement and cost reduction: Algorithmic automation contributed to accelerating transaction pace, reducing human errors, and lowering operational expenses by tangible percentages in trade, supply chains, and banking sectors.
- Development of predictive capabilities and risk management: Smart models enabled financial and commercial institutions to anticipate market trends, increase the accuracy of creditworthiness assessments, and improve early detection mechanisms for financial fraud.
- Emergence of a legislative and regulatory gap: The study revealed the inadequacy of traditional rules to accommodate the autonomous nature of AI systems, particularly regarding the determination of civil liability for damages arising from automated decisions, the protection of processed personal data privacy, and the absence of a comprehensive national framework governing their governance.

Accordingly, I present the following recommendations:

- Strengthen data governance and legislative compliance: Require actors to adopt advanced encryption protocols and achieve full conformity with personal data protection legislation (such as compliance with Algerian Law No. 18-07 and international standards like the EU General Data Protection Regulation GDPR).

- Update liability rules and digital justice: Enact legislation that regulates the allocation of legal responsibility among developers, operators, and users, and establish specialized digital arbitration centers to resolve disputes related to algorithmic environments quickly and efficiently.
- Adopt a phased transformation strategy and stability testing: Develop phased and tightly controlled plans for integrating intelligent systems within institutional structures, and require companies to conduct pre-implementation assessments of operational stability risks before granting algorithms final decision-making authority.
- Harden infrastructure and cybersecurity: Develop proactive cyber monitoring and surveillance systems capable of continuous adaptation to counter intrusion attempts, and protect data integrity from manipulation or algorithmic distortion.

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