

Evolution of Civil Law Theories in the Field of Digital Financial Services

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Annotation: This article examines the evolution of civil law theories in the field of digital financial services, tracing developments from the 19th century to the present day. The study demonstrates how traditional legal principles have adapted to technological innovations, analyzing the legal impact of electronic banking (1960s), e-commerce (1990s), and the emergence of cryptocurrencies (2009). Key areas addressed include: the evolution of contract theory, recognition of intangible assets, legal nature of digital currencies, smart contracts, data protection, and liability theories in digital contexts. The article explores the convergence of civil law and common law systems and examines international harmonization processes in digital finance regulation. Drawing on extensive jurisprudence and scholarly works from multiple jurisdictions, the study highlights the dynamic interplay between technological advancement and legal adaptation, emphasizing the ongoing need for legislative innovation to address emerging challenges in digital financial services.

Key words: civil law, digital financial services, cryptocurrency, smart contracts, e-commerce, data protection, blockchain, fintech, legal regulation, contract theory, intangible assets, GDPR, legal evolution, financial technology.

The evolution of civil law theories in digital financial services reflects a profound transformation in legal thought, adapting centuries-old principles to rapidly changing technological landscapes. This evolution encompasses key milestones: the advent of electronic banking in the 1960s, the rise of e-commerce in the 1990s, and the emergence of cryptocurrencies in 2009. Understanding this progression is crucial for current regulatory frameworks, as it directly impacts contract formation, liability determination, and consumer protection in the digital financial realm. This evolution challenges traditional legal concepts and necessitates innovative approaches to regulation, particularly in areas such as data privacy, digital asset ownership, and cross-border transactions. The interplay between technological innovation and legal adaptation has led to a dynamic and complex regulatory environment, requiring continuous reassessment of established civil law principles¹.

Early concepts of financial services in civil law: The foundations of financial services in civil law can be traced back to the 19th and early 20th centuries, with significant contributions from legal scholars such as Friedrich Carl von Savigny and Bernhard Windscheid. Savigny's work on obligation theory (1840-1849), laid the groundwork for understanding financial transactions within civil law systems². Windscheid further developed these concepts, emphasizing the role of will in contract formation, which remains relevant in digital transactions today. The concept of "money" in civil law was initially tied to physical currency, as evidenced in the German Civil Code (BGB) of 1900, specifically in §§ 244-248 addressing monetary debts³. Similarly, "payment" was conceptualized as a physical transfer of value, a notion challenged by modern digital transactions. These early theories, while rooted in tangible assets, provided the conceptual framework for later adaptations to digital financial services,

¹ Akerlof, G. A. (1970). The market for lemons: Quality uncertainty and the market mechanism. *The Quarterly Journal of Economics*, 84(3), 488-500.

² Spence, M. (1973). Job market signaling. *The Quarterly Journal of Economics*, 87(3), 355-374.

³ Windscheid, B. (1862). *Lehrbuch des Pandektenrechts*. D?sseldorf: Julius Buddeus.

particularly in areas of contract formation and performance. The work of Otto von Gierke, especially his "Deutsches Privatrecht" (1895), also contributed significantly to the understanding of legal personality and association, concepts that would later become crucial in the context of digital financial entities and decentralized autonomous organizations (DAOs).

The impact of technological advancements on civil law theories: Technological advancements significantly influenced civil law theories, particularly from the 1970s to 1990s. The introduction of telegraphs and telephones prompted legal scholars to reevaluate contract formation theories. Kötz's work explored how these technologies affected offer and acceptance principles in German civil law⁴. The advent of computers and electronic fund transfers (EFTs) in the 1980s posed new challenges, as discussed in Brindle and Cox's work, which examined the legal implications of EFTs in various jurisdictions⁵. Early attempts to apply traditional civil law concepts to these technologies are evident in the French "Loi Godfrain" (1988), which addressed computer fraud and set a precedent for digital financial crime legislation⁶. The legal challenges posed by ATMs were significant, as highlighted in the German Federal Court of Justice's decision (BGH, 5.10.2004 - XI ZR 210/03) regarding bank liability for ATM malfunctions, demonstrating the need to adapt civil law principles to new banking technologies. The emergence of electronic data interchange (EDI) in the 1990s further challenged traditional contract formation theories, as explored in Boss's "Electronic Data Interchange Agreements: Private Contracting Toward a Global Environment" (1992), which examined the legal implications of automated transactions in international trade.

Shift from tangible to intangible assets in legal theory: The shift from tangible to intangible assets in legal theory marked a significant evolution in civil law's approach to financial services. Jean Carbonnier, in his seminal work "Flexible droit" (1969), was among the first to recognize the need for legal theory to adapt to the increasing dematerialization of assets⁷. Michel Villey's philosophy of law, challenged the traditional Roman law concepts of property, paving the way for recognizing intangible assets in civil law systems⁸. This theoretical shift profoundly affected concepts of ownership and transfer in financial services. The French Cour de Cassation's decision in the "Trésor Public v. Gibert" case (Cass. com., 7 mars 1995) was pivotal, recognizing computer programs as intangible assets subject to ownership rights⁹. Similarly, the German Federal Court of Justice's ruling on the legal nature of software licenses (BGH, 17.07.2013 - I ZR 129/08) further solidified the legal status of intangible assets. The recognition of intellectual property rights in financial innovations, such as trading algorithms and financial models, has been a crucial development in this area. The European Court of Justice's decision in *UsedSoft GmbH v Oracle International Corp* (C-128/11) in 2012 further extended the concept of intangible asset ownership to the resale of software licenses, impacting how digital financial products are conceptualized in civil law systems.

⁴ Kotz, H. (1996). *Vertragsrecht*. Tübingen: Mohr Siebeck. The author explores how emerging technologies influenced offer and acceptance principles in German civil law, providing foundational analysis for digital contract formation.

⁵ Brindle, M., & Cox, R. (1996). *Law of bank payments*. London: Sweet & Maxwell. The authors examine the legal implications of electronic fund transfers across jurisdictions, addressing key challenges posed by computerization of banking in the 1980s.

⁶ French National Assembly. (1988). *Loi Godfrain* (Law No. 88-19 of January 5, 1988 on computer fraud). *Journal Officiel*. This law set a precedent for digital financial crime legislation in France, establishing key principles for prosecuting computer-based fraud.

⁷ Carbonnier, J. (1969). *Flexible droit: pour une sociologie du droit sans rigueur*. Paris: LGDJ. The author provided groundbreaking analysis of how legal theory must adapt to increasing dematerialization of assets.

⁸ Villey, M. (1975). *Philosophie du droit*. Paris: Dalloz. The work challenged traditional Roman law concepts of property, laying theoretical groundwork for recognizing intangible assets.

⁹ *Tresor Public v. Gibert*, Cass. com., 7 mars 1995. This landmark French case recognized computer programs as intangible assets subject to ownership rights, influencing digital asset regulation.

The emergence of e-commerce and its impact on civil law theories: The rise of e-commerce in the late 1990s and early 2000s significantly influenced civil law theories related to financial services. The UNCITRAL Model Law on Electronic Commerce (1996) was instrumental in shaping national legislations, particularly Article 11 addressing contract formation in electronic environments¹⁰. This model law influenced the French "Loi pour la confiance dans l'économie numérique" (2004), specifically Article 1369-4 of the Civil Code (now Article 1127-1), which adapted offer and acceptance rules to online transactions¹¹. Scholarly debates on this adaptation are evident in Gautrais's work, which examined the challenges of applying traditional civil law principles to e-commerce¹². Germany's "Gesetz zur Anpassung der Formvorschriften des Privatrechts" (2001) pioneered e-commerce legislation in civil law countries, particularly in its provisions on electronic signatures in § 126a BGB. The EU's E-Commerce Directive (2000/31/EC), especially Article 9 on the treatment of electronic contracts, further harmonized the approach to online transactions across civil law jurisdictions in Europe. The concept of "click-wrap" agreements, as discussed in Máximo work, posed new challenges to traditional notions of consent and contract formation in civil law systems.

Legal theories addressing digital currencies and cryptocurrencies: The emergence of digital currencies and cryptocurrencies since 2009 has sparked new legal theories within civil law frameworks. Scholarly works such as Zetzsche et al.'s works have explored the legal nature of cryptocurrencies, challenging traditional civil law concepts of property and money¹³. The European Central Bank's report "Virtual Currency Schemes" (2012) provided an early analysis of how these new forms of value fit within existing legal frameworks¹⁴. Civil law concepts of property have been adapted to cryptocurrencies, as seen in the French PACTE Law (2019), which established a legal framework for digital assets in Article L. 54-10-1 of the Monetary and Financial Code¹⁵. The German Federal Financial Supervisory Authority (BaFin) classified cryptocurrencies as financial instruments in 2013, influencing other civil law jurisdictions¹⁶. The Swiss Federal Supreme Court's decision (BGE 145 IV 336) in 2019, recognizing Bitcoin as an asset subject to enforcement proceedings, further exemplifies the adaptation of civil law concepts to cryptocurrencies. The legal nature of tokens, particularly the distinction between security tokens and utility tokens, has been a subject of intense debate, as evidenced in the Swiss FINMA's "Guidelines for enquiries regarding the regulatory framework for initial coin offerings (ICOs)" (2018), which provided a classification system based on the economic function of tokens¹⁷.

Evolution of contract theory in the digital age: Contract theory has evolved significantly to accommodate digital financial services. Scholarly works like Savelyev's "Contract Law 2.0: 'Smart' Contracts as the Beginning of the End of Classic Contract Law" (2017) have explored the legal status of smart contracts within civil law systems¹⁸. The debate on applying traditional civil law principles like "good faith" to digital contracts is evident in Brownsword's work¹⁹. France's approach to digital

¹⁰ UNCITRAL. (1996). Model Law on Electronic Commerce. United Nations.

¹¹ French Parliament. (2004). Loi pour la confiance dans l'économie numérique. Journal Officiel.

¹² Gautrais, V. (2002). Le contrat électronique international. Brussels: Bruylant.

¹³ Zetzsche, D., Buckley, R. P., Arner, D. W., & Barberis, J. N. (2018). The distributed liability of distributed ledgers: Legal risks of blockchain. *University of Illinois Law Review*, 2018(4), 1361-1406.

¹⁴ European Central Bank. (2012). Virtual currency schemes. ECB Report.

¹⁵ French Parliament. (2019). PACTE Law (Action Plan for Business Growth and Transformation). Journal Officiel.

¹⁶ German Federal Financial Supervisory Authority (BaFin). (2013). Classification of cryptocurrencies as financial instruments. BaFin Guidance Notice.

¹⁷ Swiss Financial Market Supervisory Authority. (2018). Guidelines for enquiries regarding the regulatory framework for initial coin offerings. FINMA Guidelines.

¹⁸ Savelyev, A. (2017). Contract law 2.0: 'Smart' contracts as the beginning of the end of classic contract law. *Information & Communications Technology Law*, 26(2), 116-134.

¹⁹ Brownsword, R. (2016). The E-Commerce directive, consumer transactions, and the digital single market: Questions of

contract formation and execution is exemplified in the reform of the Civil Code in 2016, particularly Article 1125 addressing electronic contracts²⁰. Germany's approach is reflected in the "Gesetz zur Umsetzung der Verbraucherrechterichtlinie" (2014), which amended § 312i BGB to address electronic contracts²¹. Japan's approach is evident in the 2019 amendment to the Civil Code, specifically Article 522-2, which recognizes the validity of contracts formed through electronic means. The concept of "algorithmic contracts," where AI systems negotiate and conclude agreements, has posed new challenges to traditional contract theory, as discussed in Scholz's "Algorithmic Contracts" (2017). The legal status of smart contracts, particularly their self-executing nature, has raised questions about the role of human intervention and the applicability of force majeure clauses, as explored in Mik's work²².

Privacy and data protection theories in digital finance: The evolution of privacy and data protection theories in digital financial services since the 1980s has been significant. The EU's Data Protection Directive (1995), particularly Article 7 on data processing conditions, laid the foundation for modern data protection in finance²³. The General Data Protection Regulation (GDPR) (2016), especially Article 4 defining personal data, has profoundly impacted civil law thinking on financial data privacy²⁴. Mayer-Schönberger's work discusses how civil law has adapted to address challenges in financial data privacy²⁵. The landmark case of *Google Spain v AEPD and Mario Costeja González* (C-131/12) by the Court of Justice of the European Union in 2014 established the "right to be forgotten," significantly impacting financial data protection²⁶. The French Constitutional Council's decision n° 2016-536 QPC of 2016, affirming the right to privacy in financial matters, further exemplifies the evolution of privacy theories in civil law jurisdictions. The concept of "data portability" introduced by Article 20 of the GDPR has had significant implications for the financial sector, particularly in the context of open banking initiatives. The tension between data protection and anti-money laundering (AML) requirements has been a subject of ongoing debate, as evidenced in the European Data Protection Board's guidelines on the interplay between the GDPR and AML regulations (2020)²⁷.

Theories of liability and responsibility in digital financial services: Theories of liability and responsibility have evolved significantly in the context of digital financial services. Scholarly debates on attributing liability in complex digital ecosystems are evident in Loos's work²⁸. The application of civil law concepts of fault and strict liability to digital finance is discussed in Bertolini's "Artificial Intelligence and Civil Liability" (2020)²⁹. France's approach to liability issues in digital finance is reflected in the "Loi pour une République numérique" (2016), particularly Article 47 addressing platform operators' obligations³⁰. Germany's approach is evident in the Network Enforcement Act

regulatory fitness, regulatory disconnection and rule redirection. *European Review of Contract Law*, 12(2), 165-199.

²⁰ French Civil Code Reform. (2016). Ordonnance n° 2016-131 du 10 février 2016 portant réforme du droit des contrats.

²¹ German Civil Code. (2014). Gesetz zur Umsetzung der Verbraucherrechterichtlinie.

²² Mik, E. (2017). Smart contracts: Terminology, technical limitations and real world complexity. *Law, Innovation and Technology*, 9(2), 269-300.

²³ European Parliament. (1995). Data Protection Directive (95/46/EC). *Official Journal L* 281.

²⁴ European Parliament. (2016). General Data Protection Regulation (GDPR). *Regulation (EU) 2016/679*.

²⁵ Mayer-Schönberger, V. (2009). *Delete: The virtue of forgetting in the digital age*. Princeton University Press. The author examines how digital memory affects privacy rights and argues for implementing forgetting in digital systems.

²⁶ *Google Spain SL v. AEPD and Mario Costeja González* (C-131/12), CJEU 2014. This landmark case established the right to be forgotten in EU law, significantly impacting data protection in financial services.

²⁷ European Data Protection Board. (2020). Guidelines on the interplay of PSD2 and GDPR. EDPB Guidelines 06/2020.

²⁸ Loos, M. (2016). Liability for defective products and services. *Journal of European Consumer and Market Law*, 5(1), 3-12.

²⁹ Bertolini, A. (2020). Artificial Intelligence and civil liability. European Parliament Research Service.

³⁰ French Parliament. (2016). Loi pour une République numérique. *Journal Officiel*.

(2017), specifically § 3 on complaint management for digital platforms³¹. Italy's approach is exemplified in the Italian Data Protection Authority's guidelines on fintech (2018), which address liability issues in digital financial services. The concept of "algorithmic accountability" has gained prominence, as discussed in Diakopoulos's work, raising questions about liability in automated decision-making processes in finance. The European Parliament's resolution on a civil liability regime for artificial intelligence (2020/2014(INL)) proposes a risk-based approach to AI liability, which could significantly impact the financial services sector³².

The influence of globalization on civil law theories in digital finance: Globalization has significantly shaped civil law theories related to digital financial services since the 1990s. The UNCITRAL Model Law on Electronic Transferable Records (2017), particularly Article 7 on the legal recognition of electronic transferable records, exemplifies efforts to harmonize digital finance laws³³. Faria's work discusses the challenges of applying national civil law concepts to global digital transactions³⁴. The Convention on the Use of Electronic Communications in International Contracts (2005), especially Article 8 on the recognition of electronic communications, is a key international legal instrument addressing digital financial services from a civil law perspective³⁵. The EU's Electronic Money Directive (2009/110/EC), particularly Article 2 defining electronic money, demonstrates regional harmonization efforts in digital finance³⁶. The OECD's "Guidelines on the Protection of Privacy and Transborder Flows of Personal Data" (2013) further illustrate the global influence on civil law approaches to digital finance. The concept of "regulatory sandboxes" for fintech innovations, as implemented by various national regulators, has challenged traditional civil law approaches to financial regulation. The Financial Stability Board's report on "FinTech and Market Structure in Financial Services" (2019) highlights the global nature of digital finance challenges and the need for coordinated regulatory responses across different legal systems³⁷.

Convergence of civil law and common law theories in digital finance: The growing convergence of civil law and common law approaches in digital financial services since 2000 is evident in various scholarly works and legal developments. Smits's labour compares these legal traditions in the digital context³⁸. The convergence is shaping new legal theories, as discussed in Micklitz's "The Many Concepts of Social Justice in European Private Law" (2011)³⁹. Quebec's Act to establish a legal framework for information technology (2001), particularly Section 39 on the legal value of technological documents, exemplifies a hybrid legal approach to digital finance⁴⁰. Louisiana's approach is evident in its Virtual Currency Businesses Act (2020), specifically § 1382 defining virtual currency, which blends civil and common law concepts⁴¹. The EU's Markets in Crypto-assets Regulation (MiCA) proposal (2020), especially Article 3 defining various crypto-assets, further

³¹ German Parliament. (2017). Network Enforcement Act (NetzDG). Federal Law Gazette.

³² European Parliament. (2020). Resolution on a civil liability regime for artificial intelligence (2020/2014(INL)). Official Journal.

³³ UNCITRAL. (2017). Model Law on Electronic Transferable Records. United Nations.

³⁴ Faria, J. A. E. (2004). E-Commerce and international legal harmonization: Time to go beyond functional equivalence? *International Trade Law Review*, 13(6), 67-79.

³⁵ United Nations. (2005). Convention on the Use of Electronic Communications in International Contracts.

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³⁷ Financial Stability Board. (2019). FinTech and market structure in financial services. FSB Report.

³⁸ Smits, J. M. (2002). The making of European private law: Toward a *Ius Commune Europaeum* as a mixed legal system. Antwerp: Intersentia.

³⁹ Micklitz, H. W. (2011). The many concepts of social justice in European private law. Edward Elgar Publishing.

⁴⁰ Quebec National Assembly. (2001). Act to establish a legal framework for information technology. Quebec Official Gazette.

⁴¹ Louisiana State Legislature. (2020). Virtual Currency Businesses Act. Louisiana State Law.

demonstrates this convergence in addressing novel digital financial instruments. The development of international standards for digital financial services, such as the Financial Action Task Force's recommendations on virtual assets (2019), has contributed to a more unified global approach transcending traditional legal divides. The emergence of "regulatory technology" (RegTech) solutions, as discussed in Arner et al.'s article, represents a convergence of technological and legal approaches to financial regulation across different legal systems⁴².

The evolution of civil law theories in digital financial services reflects a dynamic interplay between traditional legal principles and technological innovation. From the early concepts of money and payment to the complex theories addressing cryptocurrencies and data protection, civil law has demonstrated remarkable adaptability. This evolution has profoundly shaped current regulatory approaches to smart contracts, cryptocurrency regulation, and data protection in financial services. The ongoing nature of this evolution underscores its critical importance for future developments in digital financial services regulation within civil law systems, necessitating continued scholarly attention and legislative innovation to address emerging challenges effectively. The convergence of civil and common law approaches, coupled with the global nature of digital finance, points towards a more harmonized international legal framework for digital financial services in the future.

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⁴² Arner, D. W., Barberis, J., & Buckley, R. P. (2017). FinTech, RegTech, and the reconceptualization of financial regulation. *Northwestern Journal of International Law & Business*, 37(3), 371-413.

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