



Technological disruption from a legal perspective

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Abstract

The rapid development and advancement of technology has become a major influence on social change in society today. Communication and information technology have evolved into an essential need for the public and their presence has become integrated with people's daily lives. As a result of this technological progress, it can be said geographical boundaries no longer exist due to the flow of information. These developments and advancements in technology have brought many changes to the social structure of society. Without realizing it, these changes have led society into a new era known as the era of disruption. This disruption, filled with new innovations has brought society into a new social order that is vastly different from what previously existed. The growth of disruption in the field of technology poses unique challenges for legal implementation. The new innovations emerging in the era of disruption are so novel and different that they inevitably create tensions between the law and disruption itself. This paper will discuss the legal perspective on technological disruption, in which the law ultimately has not yet been able to fully position itself amid the current wave of disruption.

Keywords: Technology, disruption, law

Introduction

Over time, human civilization has continued to develop. History records that humans have experienced the growth of civilization starting from Ancient Greece, the Roman Era, and the Middle Ages, commonly referred to as the Classical Era. Human civilization then entered the Renaissance, the Enlightenment, the 19th century, and the 20th century, often known as the Modern Era.^[1]

The development of human civilization did not stop in the 20th century. Up to the present day, humans have entered an even more modern era: the 21st century. In this century, often referred to as the millennial age, many new phenomena have emerged that greatly influence social life.

One of the main characteristics of the 21st Century is rapid advancement in technology, communication, and information. These developments have advanced at an astonishing pace and significantly impacted social life. Throughout the first two decades of the 21st Century, technology, communication, and information have become essential needs for society, merging with daily life. As a result of the advancements in communication and information technology, geographical boundaries seem to have disappeared due to the flow of information^[2]. These technological developments have transformed the way humans communicate, making society highly dependent on technology itself.^[3]

The rise of online transactions has become one of the distinctive features of this technological growth. The ease of access offered by technology allows nearly everything to be done digitally. Digital-based activities are now found in nearly all aspects of life, from fulfilling daily needs such as purchasing food and clothing to accessing education and employment, transportation, and even banking. These digital transactions provide convenience and practicality for people in today's increasingly modern era.

The changes emerging from technological advancements mark the beginning of a series of transformations that have been ongoing for decades. The changes of recent years are fresh and unique. Due to these shifts, many people have

realized that we are entering an era of disruption, an era in which new innovations appear, both in digital technology and in social structures^[4].

The development of disruption—particularly in technology—poses challenges for the legal system. New innovations emerging in the era of disruption are unfamiliar and different from the existing order, often creating tension between law and disruption. Therefore, this paper discusses the legal perspective on technological disruption. Based on the background described above, the research question posed is: How does law view technological disruption?

Method

This research uses normative legal research, which examines law as norms or rules within society that guide human behavior^[5]. Normative legal research positions law as a system of norms.^[6] These legal norms serve as literature sources in the form of principles, rules, or statutory regulations. This research was conducted using a literature study by analyzing legal materials such as books, journal articles, legislation, and other relevant documents. The research was analyzed qualitatively and inductively by collecting legal materials, organizing them systematically, and analyzing them inductively.

Results and Discussion

Technological Disruption

Disruption is a form of innovation, one that replaces existing innovation with a new approach. Disruption replaces conventional physical technologies with digital ones, producing something innovative, efficient, and more useful^[7]. Meanwhile, technology generally refers to tools, machines, processes, activities, or ideas designed to facilitate human life. The purpose of technology is to make human life simpler and better^[8]. Based on these definitions, technological disruption can be described as tools, machines, processes, activities, or ideas that offer new innovations beneficial to human life today.

Technological disruption occurs continuously ^[9]. It is inherently unsettling because it repeats and evolves. Infrastructure technologies within society do not remain constant. One important aspect of this change is that society must acknowledge that these changes are happening, even though such awareness is not always easy. ^[10]

Technological disruption is a fundamental change signaled by rapid technological advancement. Drastic social changes caused by technological progress reflect the increasing presence of technological disruption ^[11] It is ‘an ongoing condition that continues in line with technological progress.’ ^[12]

Impact of Technological Disruption

Any form of technology tends to be disruptive—whether positively or negatively. ^[13] With continuous technological advancement, the era of disruption has strengthened. Rapid technological growth has created phenomena affecting social transformation. These transformations have two perspectives: some changes bring positive benefits, while others may cause decline. Characteristics of phenomena triggering social change include ^[14]

1. Society will always develop due to ongoing changes—slow or fast.
2. Changes within one social institution affect other institutions.
3. Rapid social change can cause temporary disorganization during adaptation.
4. Change affects both material and spiritual aspects, which interact intensively.

Technology penetrates social life, forming new behavioral patterns. This is seen in daily life where technological disruption integrates with human activities in previously unimaginable ways. Technological advancement provides modern tools that help humans perform daily tasks, such as in production, communication, and transportation. Transportation technology functions as methods or devices enabling individuals to move safely, comfortably, quickly, affordably, and in an environmentally friendly manner ^[15].

Due to technological development, the spread of information and human actions can reach vast distances within seconds. Humans have also shifted much of their activities from the physical world to the virtual world. Shopping, booking tickets, traveling, developing communication skills, and conducting business have all adopted this new approach. ^[16]

Technology affects not only social and economic sectors but also politics and governance. Political movements have become easier via social media, online petitions, and even e-governance. These changes stem from technological disruption and are strongly linked to the Industrial Revolution 4.0.

The industrial revolution consists of two terms: revolution and industry. According to the *Kamus Besar Bahasa Indonesia* (KBBI), a revolution refers to a change that occurs very rapidly, while industry refers to activities involved in the production process. Therefore, when these two terms are combined, they indicate a rapid change in production processes. This rapid change not only focuses on increasing the quantity of goods produced, but also aims to improve the quality of production outcomes. ^[17]

The term industrial revolution was introduced by Friedrich Engels and Louis Auguste Blanqui in the mid-19th century.

The transition from one phase to another has created distinct differences:

1. Industry 1.0, invention of machinery and mechanization.
2. Industry 2.0, mass production with quality control and standards.
3. Industry 3.0, reliance on computers and automation.
4. Industry 4.0, digitalization and automation that integrate the internet with the manufacturing sector.

Industry 4.0 began gaining attention in 2011 in Germany. It initially referred to the use of virtual and physical technologies in factories. Over time, the concept expanded and developed its own characteristics, involving the convergence of physical, digital, and biological technologies. ^[18]

Following Industry 4.0, society has entered a newer era: Society 5.0. This concept places humans at the center with advanced technologies ^[19]. Artificial Intelligence (AI), robotics, Internet of Things (IoT), as tools to support daily life. Society 5.0 creates new value that reduces social inequality and balances business, economic, and social development. ^[20]

A result of Industry 4.0 and Society 5.0 is the emergence of disruptive innovation. Its influence has spread across various sectors: industry, economy, education, politics, and more. It changes global lifestyle and mindset. Disruptive innovation refers to the decline of incumbent industries replaced by new players due to digital technology.

One example is the decline in revenue among conventional motorcycle taxi and transportation companies, not due to fewer passengers but changes in consumer behavior. Digital start-ups such as GO-JEK, Grab, and Maxim offer services via mobile apps with cheaper rates. These new players disrupted existing transportation companies ^[21] Other examples include jobs replaced by automation—airport check-in counters replaced by machines that scan passports, print boarding passes, and luggage tags. These are signs of digitalization, automation, and robotics shaping the disruption era ^[22]

On the other hand, new professions have emerge: YouTubers, website developers, bloggers, game developers, and many others. Disruptive innovation also creates opportunities, such as:

- a. Increased consumer convenience and lower costs.
- b. Access to more advanced technology.
- c. Encouragement of innovation-driven competition.

Legal Perspective on Technological Disruption

Technological disruption creates a new world known as the digital marketplace, where buyers and sellers meet without physical interaction. This signals a shift in market structure. When the market changes, consumers move. Disruption introduces invisible competitors—often unnoticed by society ^[23].

When society begins to recognize these invisible competitors, confusion and suspicion may arise, although among them may be sources of benefit. Those who adapt quickly gain new business opportunities and survive. Meanwhile, those who fail to adapt may lose relevance. Thus, disruption has shifted social structures and values. Not all changes are positive; technology has a dual nature. ^[24] Its innovations may collide with various sectors—including law.

Currently, many observers and lawmakers refer to these invisible competitors as ‘illegitimate children.’ They emerge without adhering to existing legal regulations. They produce new innovations that violate the law and do not comply with statutory provisions. Those who feel threatened by disruption support and pressure lawmakers to create legal rules or legislation that can be used to restrict the movement and growth of the disruption.

The parties who feel disturbed are the traditional players who failed to stay aware of ongoing developments, causing them to eventually feel threatened and ultimately defeated. After feeling threatened and defeated, they then pressured lawmakers to establish new regulations for their unseen competitors. These two situations demonstrate that the presence of technological disruption creates two phenomena: the emergence of public anxiety toward the massive advancement of technology, and the limitations of the law in keeping pace with the speed of technological progress [25].

A clear example in Indonesia is online transportation regulations. At the rise of ride-hailing services, the government attempted to regulate them. Conventional transport operators supported regulation, claiming unfairness since online transport operated without legal guidelines. Conversely, online companies like Go-Jek, Grab, and Maxim opposed strict regulation, arguing they were not transportation companies but app providers.

The government—through the Ministry of Transportation—has struggled for years to finalize online transport regulations. Despite multiple attempts since 2016, consensus has not yet been reached. This shows that disruption overwhelms bureaucrats and lawmakers. Law still struggles to position itself amid rapid disruption. The legal system views disruption as new and unfamiliar, needing time to adapt.

conclusion

Technological disruption is a major innovation that replaces old systems, processes, and technologies with faster, more efficient, and more adaptive digital approaches. The rapid development of technology has brought fundamental changes to the social life of society, from patterns of interaction, work methods, production processes, to economic and political systems. These continuous changes have created an inevitable social transformation.

The phenomenon of disruptive innovation has given rise to new professions and provided various conveniences for society, but it has also posed threats to traditional industries. Many conventional jobs have disappeared due to automation and digitalization, while society has increasingly shifted toward virtual spaces to meet daily needs. The positive and negative impacts of disruption demonstrate that technology has ‘two sides’ that coexist.

These major changes also present challenges for the legal sector. Many new innovations emerge without a legal framework, leading them to be seen as violating regulations by traditional actors. This has triggered pressure on lawmakers to quickly establish new regulations. However, the legal system struggles to keep pace with the speed of technological development. This lag has resulted in two significant phenomena: growing public anxiety over the rapid advancement of technology, and the inability of the law to move as quickly as digital innovation.

Law—as one of those values—views disruption as entirely new and unfamiliar. The legal system has not yet fully

adapted to the rapid flow of disruption. This shows that the era of technological disruption reflects the workings of legal sociology: law is not only found in written statutes but also in society.

References

1. Abdul ghofur ansori, *failsafe hukum yogyakarta: ugm press*, 2009.
2. Nasarudin umar, “konsep hukum modern: suatu perspektif keindonesiaan, integrasi sistem hukum agama dan sistem hukum nasional,” *walisongo: jurnal penelitian sosial keagamaan*, 2014:22(1):157–80, <https://doi.org/10.21580/ws.22.1.263>.
3. Renny ns. Koloay, “koloay rns: perkembangan hukum indonesia.... Vol.22/no.5/januari /2016 jurnal hukum unsrat,” *jurnal hukum unsrat*, 2016:22:(5):16–27.
4. Wiliams flavian pita roja, “disrupsi sebagai tantangan dan peluang milenial,” 2018. <https://www.kompasiana.com/wiliamsroja/5bff4d84aebel0c7d3555a4/disrupsi-sebagai-tantangan-dan-peluang-milenial>.
5. Wiwik sri widiarti, *buku ajar metode penelitian hukum (yogyakarta: publika global media)*, 2024.
6. Mukti fajar nd and yulianto achmad, *dualisme penelitian hukum (yogyakarta: pustaka pelajar)*, 2010.
7. Rhenald kasali, *disruption (jakarta: gramedia pustaka utama)*, 2017.
8. Zakky, “pengertian teknologi | definisi, fungsi, manfaat, jenis-jenis,” 2021, <https://www.zonareferensi.com/pengertian-teknologi/>.
9. Muhammad reza winata and oly viana agustine, “rekoneksi hukum dan disrupsi teknologi melalui tafsir mendukung pembangunan ekonomi,” *legislasi Indonesia*, 2019:16(16):458–76, <https://doi.org/10.54629/jli.v16i4.529>.
10. Mathias klang, *disruptive technology: effect of technology regulation on democracy (gotenborg: gotenborg university)*, 2009.
11. Z ridlwan, “sandaran moral negara hukum indonesia di era disrupsi teknologi,” *karya ilmiah*, no. October, 2019.
12. Muhammad reza winata and oly viana agustine, “rekoneksi hukum dan disrupsi teknologi melalui tafsir mendukung pembangunan ekonomi.”
13. Karman, “disruptif teknologi internet dan eksistensi media cetak internet technology disruption and the print media existence,” *jurnal Kementerian komunikasi dan informatika direvisi*, 2017, 9(12–12).
14. Wahyuningtyas dwi saputri and dian riskiana resty, “dampak medua dalam era disrupsi sebagai perwujudan integrasi pemilihan presiden (pilpres) 2019,” *jurnal seminar nasional hukum universitas negeri semarang*, 2018:4:(3).
15. Arif budiarto and mahmudah, *rekayasa lalu lintas (semarang: uns semarang)*, 2017.
16. Kasali, *disruption*.
17. Sigit priatmoko, “eksistensi, memperkuat islam, pendidikan era, d i,” *jurnal studi islam*, 2018:1(2):221–39.
18. Muhammad reza winata and oly viana agustine, “rekoneksi hukum dan disrupsi teknologi melalui tafsir mendukung pembangunan ekonomi.”
19. Vania sasikirana and yusuf tri herlambang, “urgensi merdeka belajar di era revolusi industri 4.0 dan tantangan society 5.0,” *e-tech*, 2020, 8(2).

20. Faulinda ely nastiti and aghni rizqi ni'mal 'abdu, "kesiapan pendidikan indonesia menghadapi era society 5.0," edomtech: jurnal kajian teknologi Pendidikan,2020:5(1):61–66.
21. Priatmoko, "eksistensi, memperkuat islam, pendidikan era, d i."
22. Mardani wijaya, kurniawan, and mohammad sood, "the constitutional right of citizens to work in the industrial revolution era 4.0," jurnal ius kajian hukum dan keadilan,2019:7(2):182–93, <https://doi.org/10.29303/ius.v7i2.637>.
23. Kasali, disruption.
24. Iskandar wibawa *et al.*, "era digital (pergeseran paradigma dari hukum modern ke post modernisme)," masalah-masalah hokum, 2016:45(4):285–91, <https://doi.org/10.14710/mmh.45.4.2016.285-291>.
25. Muhammad reza winata and oly viana agustine, "rekoneksi hukum dan disrupsi teknologi melalui tafsir mendukung pembangunan ekonomi."s
26. Budiarto Arif, Mahmudah. *Rekayasa Lalu Lintas*. Semarang: UNS Semarang, 2017.
27. Dwi Saputri, Wahyuningtyas, and Dian Riskiana Resty. 'Dampak Medua Dalam Era Disrupsi Sebagai Perwujudan Integrasi Pemilihan Presiden (Pilpres) 2019.' *Jurnal Seminar Nasional Hukum Universitas Negeri Semarang*,2018:4:(3).
28. Ely Nastiti, Faulinda, Aghni Rizqi Ni'mal 'Abdu. 'Kesiapan Pendidikan Indonesia Menghadapi Era Society 5.0.' *Edomtech: Jurnal Kajian Teknologi Pendidikan*,2020:5(1):61–66.
29. Fajar ND, Mukti, and Yulianto Achmad. *Dualisme Penelitian Hukum*. Yogyakarta: Pustaka Pelajar, 2010.
30. Flavian Pita Roja, Wiliams. 'Disrupsi Sebagai Tantangan Dan Peluang Milenial,' 2018. <https://www.kompasiana.com/wiliamsroja/5bff4d84aeebe10c7d3555a4/disrupsi-sebagai-tantangan-dan-peluang-milenial>. Accessed on 14 October 2025.
31. Ghofur Ansori, Abdul. *Filsafat Hukum*. Yogyakarta: UGM Press, 2009.
32. Karman. 'Disruptif Teknologi Internet Dan Eksistensi Media Cetak Internet Technology Disruption and the Print Media Exictence.' *Jurnal Kementerian Komunikasi Dan Informatika Direvisi*,2017:9:12–12.
33. Kasali, Rhenald. *Disruption*. Jakarta: Gramedia Pustaka Utama, 2017.
34. Klang, Mathias. *Disruptive Technology: Effect of Technology Regulation on Democracy*. Gotenborg: Gotenborg University, 2009.
35. Koloay, Renny N.S. 'Koloay R.N.S: Perkembangan Hukum Indonesia. Januari *Jurnal Hukum Unsrat*, 2016, 5(22)
36. Muhammad Reza Winata, and Oly Viana Agustine. 'Rekoneksi Hukum Dan Disrupsi Teknologi Melalui Tafsir Mendukung Pembangunan Ekonomi.' *Legislasi Indonesia*,2019:16(16):458–76. <https://doi.org/10.54629/jli.v16i4.529>.
37. Priatmoko Sigit. 'Eksistensi, Memperkuat Islam, Pendidikan Era, D I.' *Jurnal Studi Islam*,2018:1(2): 221–39.
38. Ridlwan, Z. 'Sandaran Moral Negara Hukum Indonesia Di Era Disrupsi Teknologi.' *Karya Ilmiah*, 2019.
39. Sasikirana, Vania, and Yusuf Tri Herlambang. 'Urgensi Merdeka Belajar Di Era Revolusi Industri 4.0 Dan Tantangan Society 5.0.' *E-Tech*, 2020, 8(2).
40. Sri Widiarti, Wiwik. *Buku Ajar Metode Penelitian Hukum*. Yogyakarta: Publika Global Media, 2024.
41. Umar, Nasarudin. 'Konsep Hukum Modern: Suatu Perspektif Keindonesiaan, Integrasi Sistem Hukum Agama Dan Sistem Hukum Nasional.' *Walisongo: Jurnal Penelitian Sosial Keagamaan*,2014:22:(1):157–80. <https://doi.org/10.21580/ws.22.1.263>.
42. Wibawa, Iskandar, Jl Lingkar, Utara Gondangmanis, and Bae Kudus. 'Era Digital (Pergeseran Paradigma Dari Hukum Modern Ke Post Modernisme).' *Masala Masalah Hukum*.2016:45(4):285–91. <https://doi.org/10.14710/MMH.45.4.2016.285-291>.
43. Wijaya, Mardani, Kurniawan, and Mohammad Sood. 'The Constitutional Right of Citizens to Work in the Industrial Revolution Era 4.0.' *Jurnal IUS Kajian Hukum Dan Keadilan*,2019:7(2):182–93. <https://doi.org/10.29303/ius.v7i2.637>.
44. Zakky. 'Pengertian Teknologi Definisi, Fungsi, Manfaat, Jenis-Jenis,' 2021. <https://www.zonareferensi.com/pengertian-teknologi/>. Accessed on 14 October 2025.