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Transformation of Business Law in the Era of Industrial Revolution 4.0: Implications for Business Models and Corporate Governance

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Abstract

This study analyzes how the Industrial Revolution 4.0 has transformed business law, business models, and corporate governance. The study explores corporate adaptation to advanced technologies such as blockchain and artificial intelligence (AI), and their implications for regulation and legal compliance using a qualitative research approach. Data were collected through in-depth interviews with legal experts, regulators, and senior managers from various companies. Key findings suggest that business law needs to continue to evolve to accommodate technological innovations, while companies must integrate these technologies into their operations and governance to remain competitive and comply with increasingly complex regulations. The study also finds that the use of technologies, such as blockchain, can improve transparency and efficiency in the supply chain, while a data-driven approach to decision-making can strengthen governance and risk management. The study highlights the importance of building flexible and technology-oriented management structures to address dynamic regulatory challenges. This study makes a significant contribution to the literature on the adaptation of business law and corporate governance in the digital era.

Keywords: Industrial Revolution 4.0, business law, business models, corporate governance, technology.

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A. Introduction

The Industrial Revolution 4.0 is characterized by the integration of advanced technologies that are fundamentally changing the industrial landscape and the way businesses are conducted worldwide. Technologies such as artificial intelligence (AI), Internet of Things (IoT), big data, blockchain, and automation have become key pillars in this transformation. Artificial intelligence enables systems to learn and make intelligent decisions independently, improving operational efficiency and product innovation (Agrawal, 2022; Mokyr, 2018). IoT connects devices and systems in real time, enabling continuous data collection and analysis, which is then used to optimize business processes. Big data provides the ability to analyze very large and complex volumes of data, helping companies make more informed data-driven decisions. Blockchain, with its decentralized and secure characteristics, is changing the way business transactions are conducted, especially in terms of transparency and trust (Romanova & Kuzmin, 2021; Yalenios & d'Armagnac, 2023). Automation technologies accelerate production and operations processes by reducing reliance on human labor, thereby saving costs and time. The combination of these technologies has accelerated digitalization and automation across sectors, forcing businesses to adapt to new business models that are more efficient and responsive to dynamic market needs (Friska, 2023; Jawad et al., 2021).

The development of technology in the Industrial Revolution 4.0 has not only brought changes at the operational level, but also to business strategies and business models as a whole. Companies now have to

face challenges and opportunities that have never existed before. AI not only replaces routine tasks but also provides new, in-depth insights through predictive analysis, helping companies respond to the market faster and more accurately (Kershaw & Schuster, 2021; Kuru & Yetgin, 2019). IoT integration allows companies to monitor and manage their assets in real-time, creating new efficiencies in the supply chain and daily operations, big data becomes an indispensable tool in understanding consumer trends, identifying risks, and designing more effective marketing strategies with the ability to analyze massive data (Popkova et al., 2019; Prabowo et al., 2021).

Blockchain is changing the paradigm in business transactions, especially in the financial, supply chain, and legal industries, with its security and transparency, this technology enables smart contracts to be executed automatically without the need for third-party intervention, thereby reducing costs and increasing efficiency (Hang, 2021; Manda & Backhouse, 2017). In the financial sector, blockchain provides solutions to issues such as data security and transaction transparency, which were previously major challenges. Automation technology, on the other hand, enables mass production with unmatched speed and precision, while reducing human error and lowering production costs. Automation also plays a significant role in reducing reliance on manual labour, allowing companies to focus their human resources on more strategic and creative tasks (Mtsweni, 2020; Reier Forradellas & Garay Gallastegui, 2021).

The global adoption of these technologies is driving rapid digitization and automation across industries from manufacturing to finance to public services, and this is not only creating new business models but also forcing traditional companies to transform or risk being eroded by competition. Companies that successfully adopt these technologies are not only able to survive but also excel in creating greater added value for their customers (Balashova & Gromova, 2017). Companies that fail to adapt often find themselves lagging behind the competition or even exiting the market, the Fourth Industrial Revolution is not only about technological change but also about how technology is integrated into business strategies to create sustainable competitive advantage.

Business law must adapt quickly to accommodate the changes that are occurring. Existing regulations often lag behind technological developments, creating loopholes that can be exploited, or conversely, stifling innovation. For example, regulations on personal data protection must be updated to address the challenges arising from the use of big data and AI, which involve the collection and analysis of data on a large scale. Similarly, contract law must be adapted to address smart contracts that are executed over the blockchain (Morrar et al., 2017; Syah et al., 2024). Transformation in business law is not only necessary but is crucial to support innovation while ensuring that regulations remain relevant and effective in protecting the public interest and ensuring fair competition.

New technologies emerging in the Industrial Revolution 4.0 have changed the dynamics of competition across industries, creating new business models that challenge traditional business structures. The most prominent examples are the emergence of platform economies such as Uber and Airbnb, which leverage digital technology to connect service providers with consumers directly, eliminating the need for traditional intermediaries (Braña, 2019). These business models enable greater scale with lower operating costs, providing significant competitive advantages for these companies. The emergence of these new business models has also triggered more intense competition, with traditional companies having to adapt quickly or risk losing market share.

This transformation also brings new legal challenges, as many of these new business models operate in areas that are not yet fully regulated by existing laws. For example, Uber and Airbnb face legal challenges related to transportation and housing regulations that were not designed to accommodate platform-based business models. Business law, which previously focused on the traditional relationship between producers and consumers, must now evolve to regulate the complex digital interactions, data protection, intellectual property rights, and responsibilities and liabilities of the sharing economy. Regulations that do not keep up with this pace of innovation can create legal uncertainty, which can ultimately hinder the growth of new businesses or even conflict with existing regulations. The evolution of business law is critical to ensuring

that regulations remain relevant and able to balance supporting innovation with protecting the public interest (Kuteynikov et al., 2019).

Business law plays a crucial role in providing a regulatory framework that not only supports innovation but also protects the public interest and ensures fair competition. Amid rapid technological developments, business law serves as a balance between the need to encourage innovation and the responsibility to maintain fairness and order in the market. Regulations related to intellectual property rights must protect inventors and innovators while encouraging the spread of new technologies that can improve the quality of life of the wider community. Business law must also ensure that competition remains fair, especially when new business models emerge that have the potential to disrupt traditional industries (Marbun et al., 2023).

Business law must be able to adapt quickly to changes brought about by new technologies. Slow or rigid regulation can create barriers to innovation, create uncertainty for business actors, and even create unfairness in the market. Business law in the digital economy needs to continue to evolve to address new challenges such as personal data protection, cybersecurity, and digital transactions. Existing regulations may no longer be relevant or even counterproductive, harming innovative companies and undermining healthy competitive dynamics, and policymakers and legislators must be proactive in formulating flexible and adaptive regulations, able to keep up with the pace of technological innovation while still ensuring that the public interest is protected and competition is fair (George & George, 2020).

The gap between regulation and innovation is a common problem when regulation lags behind technological developments, creating legal uncertainty that can negatively impact businesses. For example, in the fintech and e-commerce industries, traditional regulations are often inadequate to regulate emerging new business models. This is particularly evident in the case of digital payment services and peer-to-peer lending platforms, where the lack of clear regulation poses legal challenges for companies operating in a grey area, and this uncertainty can stifle innovation, as companies face high legal risks without clear guidelines. This challenge is compounded when companies have to navigate the ever-changing regulatory landscape that accompanies the emergence of new technologies. Companies face the risk of non-compliance if they fail to adapt quickly to new regulations, which can result in fines, litigation, or even business closures. This non-compliance not only impacts a company's operations but can also damage its reputation with customers and business partners, companies need to continually monitor regulatory changes and invest in legal compliance to mitigate these risks.

Changes in business law also have significant implications for corporate governance. Companies must adapt their internal policies to ensure that they remain compliant with emerging regulations. Risk management becomes increasingly important in a rapidly changing business environment, as companies must be able to anticipate and respond quickly to legal risks. Legal compliance is no longer enough; effective governance must include a proactive strategy to address regulatory changes, and this requires companies to have a flexible governance structure, with a fast and appropriate decision-making process to maintain business continuity amid regulatory uncertainty.

This study aims to identify and analyze how business law has undergone transformation in response to the Industrial Revolution 4.0. With the rapid development of technology, various new regulations have emerged to regulate increasingly digital and complex business models. This study will focus on relevant regulations and how they affect business operations, especially in terms of legal compliance and adaptation to technological changes. This study also aims to analyze the impact of changes in business law on companies' business models. Companies today must adapt quickly to new business models that emerge in response to technological advances and new regulations. Changes in business law can have a significant impact on management structures, decision-making, and legal compliance strategies. This study will also evaluate how companies manage these changes in an increasingly complex and dynamic business environment, as well as the importance of effective governance to maintain business continuity and sustainability amidst regulatory changes.

B. Literature Review

Industrial Revolution 4.0

The Industrial Revolution 4.0 is a phase of industrial transformation characterized by the integration of digital technologies with physical systems, creating synergies between the real world and the virtual world. Its main concepts include technologies such as artificial intelligence (AI), the Internet of Things (IoT), big data, blockchain, and high automation. These technologies enable interconnection and communication between machines and between machines and humans, facilitating more efficient, flexible, and automated production processes, the main characteristics of the Industrial Revolution 4.0 are speed, scale, and profound systemic impact, affecting not only the manufacturing sector, but also services, health, education, and even government (Eberhard et al., 2017; Sullivan & Kern, 2021).

The impact of the Industrial Revolution 4.0 on global business and economy is significant. In business, companies must transform to remain competitive, adopting new, more digital and data-driven business models. These changes include developing products and services that are more tailored to consumer needs through big data analysis, as well as reducing operational costs through automation and process efficiency. The Industrial Revolution 4.0 on the global economy has created a shift in the labour market, with an increased demand for higher digital and technical skills. Previous research, such as that conducted by Schwab (2017), emphasizes that the Industrial Revolution 4.0 is changing the dynamics of global competition, where countries and companies that adapt quickly to new technologies will gain greater competitive advantages. Research by (Gong et al., 2021) outlines that the integration of technology in the Industrial Revolution 4.0 also increases productivity and enables the creation of greater added value in the global supply chain. The Industrial Revolution 4.0 also brings challenges, especially related to regulation and social impacts, such as the potential for increasing economic inequality due to automation, it is important to understand not only the benefits but also the long-term implications of this transformation for global business and economy.

Business Law in the Context of the Industrial Revolution 4.0

The rapid development of technology in the Industrial Revolution 4.0 era has driven significant evolution in business law to accommodate technological innovation and emerging new business models. Business law must adapt to the new dynamics presented by technologies such as artificial intelligence (AI), the Internet of Things (IoT), blockchain, and digital platforms. For example, the emergence of e-commerce and fintech has demanded the formation of new regulations governing digital transactions, personal data protection, cybersecurity, and intellectual property rights in the digital context (Nainggolan, 2023; Pozdnyakova et al., 2019). Research by (Butler, 2020) highlights how blockchain technology challenges traditional legal frameworks, requiring a more flexible and adaptive regulatory approach to address issues such as smart contracts and digital assets.

Business law needs to evolve to address the complexity and uncertainty presented by new platform-based business models. Platforms such as Uber and Airbnb have blurred the boundaries between service providers and consumers, raising questions about legal responsibilities, workers' rights, and taxation. According to research by (Lordan-Perret et al., 2021), traditional regulations are often ineffective in regulating the operations of these digital platforms, so a new legal framework is needed that can balance between encouraging innovation and protecting the public interest.

Data protection and privacy are also crucial areas where business law must evolve. With the increasing volume and value of data in modern business operations, regulations such as the General Data Protection Regulation (GDPR) in Europe have been enacted to ensure that personal data is properly protected. A study by (Lund & Pollman, 2021) shows that regulations such as the GDPR not only affect companies in Europe but also have global implications, encouraging companies worldwide to strengthen their data protection practices and ensure compliance with international standards, the development of AI and automation poses new legal challenges related to responsibility and accountability. For example, when AI systems make decisions that have significant impacts, questions arise about who should be held accountable for the

consequences of those decisions. A study by (Xu et al., 2018) discusses the need for a legal framework that can address complex issues related to responsibility and ethics in the use of AI, including considerations of algorithmic bias and its impact on social justice.

Business law must also adapt to the new realities brought about by digitalization in the context of international trade. Cross-border transactions are becoming increasingly common and complex, requiring harmonization of regulations between countries to ensure the smoothness and security of international trade. According to research by (Gojali, 2023), there is an urgent need for international cooperation in forming regulations that can accommodate digital trade, including aspects such as digital tariffs, security standards, and consumer protection. The evolution of business law in the era of the Industrial Revolution 4.0 must be proactive and responsive to changes in technology and business models. Regulations must be designed in such a way that they can encourage innovation and economic growth, while still ensuring protection for consumers, workers, and the public interest at large. A flexible, adaptive, and principles-based regulatory approach is key to addressing the challenges presented by this digital transformation, as suggested by various recent academic studies and discussions in the field of law and technology (Handayani et al., 2020; Rudiyanto et al., 2020).

Business Model

In the era of the Industrial Revolution 4.0, various new business models have emerged in response to rapid technological developments. One of the most prominent business models is the platform economy, which utilizes digital technology to connect service providers with consumers directly (Sukamto et al., 2023). Prime examples of this business model are companies such as Uber and Airbnb, which use platform-based applications to connect users with transportation and accommodation services in real time. Research by (Wise, 2021) shows that platform-based business models enable companies to achieve greater economies of scale with lower operating costs compared to traditional business models.

Data-driven business models are also gaining popularity, where companies rely on big data analytics to make smarter, more informed business decisions. Companies like Google and Amazon use customer data extensively to customize their product and service offerings, improving customer satisfaction and operational efficiency. According to research by (Sanden, 2020), companies that successfully adopt data-driven business models tend to have a significant competitive advantage because they can quickly respond to changes in consumer preferences and market conditions.

Fintech is another example of a rapidly evolving business model, where financial technology is used to transform the way financial services are provided. Fintech enables faster, cheaper, and more secure financial transactions through the use of blockchain, digital payments, and peer-to-peer credit solutions. Research by (Libson & Parchomovsky, 2022) revealed that fintech has disrupted the traditional financial industry, forcing banks and financial institutions to innovate and adapt to increasingly digital market demands. Subscription-based business models are also increasingly popular, especially in the media and entertainment industry. Companies such as Netflix and Spotify use this model to provide customers with ongoing access to digital content for a monthly subscription fee.

According to research by (Gadinis & Miazad, 2020; Laptev, 2021), subscription-based business models allow companies to build long-term relationships with customers, creating recurring and stable revenues. These business models reflect how companies must continue to innovate and adapt to technological changes in the Industrial Revolution 4.0 era. Companies that can integrate new technologies into their business models tend to be more successful in facing emerging challenges and taking advantage of opportunities offered by digital transformation.

Corporate Governance

Corporate governance principles relevant in the modern context include transparency, accountability, responsibility, independence, and fairness. These principles are becoming increasingly important amidst rapid changes in business law and technology. Transparency requires companies to provide clear and accurate information to stakeholders, including investors, employees, and customers. Accountability

ensures that corporate decisions are accountable to management and the board of directors, while responsibility requires companies to operate with due regard for the interests of all stakeholders, including the environment and society.

Technological developments, such as big data and AI, as well as changes in business regulations, have brought new challenges to corporate governance. Digital technology enables large-scale data collection and analysis, which can improve transparency and operational efficiency, but also pose risks to data privacy and security. Therefore, companies must strengthen the principles of accountability and responsibility in the use of this technology to maintain public trust (Schwab, 2017).

According to research by (Putra, 2023), good governance requires a framework that can manage technological risks and ensure that companies remain compliant with applicable regulations. Independence in corporate governance is also increasingly important in the digital era. Companies need to have an independent and diverse board of directors to ensure objective decision-making that is not influenced by personal interests or conflicts of interest. Research by (Pluta-Zaremba & Szelagowska, 2021) shows that an independent board of directors is more effective in overseeing management and directing corporate strategy, especially in facing complex challenges such as those presented by new technologies.

Fairness as a governance principle demands equal treatment of all stakeholders. In the context of evolving business law, companies must ensure that their policies are fair and non-discriminatory, whether in terms of employees, business partners, or customers. Research by (Bondarenko & Aleshkovski, 2019) emphasizes the importance of fair governance to maintain corporate integrity and prevent unethical or illegal business practices. Changes in business law and technology require adjustments in corporate governance principles. Companies must strengthen their governance structures to face emerging challenges, ensuring that the principles of transparency, accountability, responsibility, independence, and fairness remain the foundation of corporate operations and decision-making in the era of the Industrial Revolution 4.0.

C. METHOD

Research Design

This study uses a qualitative approach with the aim of understanding in depth how business law is transforming in response to the Industrial Revolution 4.0 and how this affects business models and corporate governance. Qualitative research allows researchers to explore in-depth perspectives from informants who are directly involved in these changes, such as lawyers, corporate managers, and regulators, and to understand the specific contexts that influence business decisions and strategies.

Data Collection

Data will be collected through in-depth interviews and company case studies. In-depth interviews will be conducted with experts in business law, management, and technology to gain insights into how regulation and technology impact business models and corporate governance. Company case studies will be used to analyze how specific companies have navigated legal and technological challenges in the Industrial Revolution 4.0 era. These case studies will provide concrete examples of how companies have adapted to regulatory and technological changes, and their impact on corporate operations and governance.

Data Analysis

The collected data will be analyzed using content analysis methods for interviews and thematic analysis for case studies. Content analysis will be used to identify key themes from the interview transcripts, such as regulatory challenges, adaptation strategies, and changes in corporate governance. Thematic analysis will be applied to the case study data to explore common patterns and differences in corporate responses to the Industrial Revolution 4.0. These techniques allow researchers to identify trends and relationships between key variables examined in this study.

Conceptual Framework

The conceptual framework in this study will be depicted in the form of a diagram that connects the main variables: technology, business law regulation, business models, and corporate governance. In this diagram, technology and business law regulation will be treated as independent variables that affect business models and corporate governance, which act as dependent variables. Technology includes developments in AI, IoT, big data, and blockchain, while business law regulation includes new regulations that emerge to accommodate these technologies. Business models and corporate governance will be analyzed in the context of how they adapt to the pressures of evolving technology and regulations. This framework will help in visualizing the causal relationships between these variables and serve as a guide in analyzing the collected data.

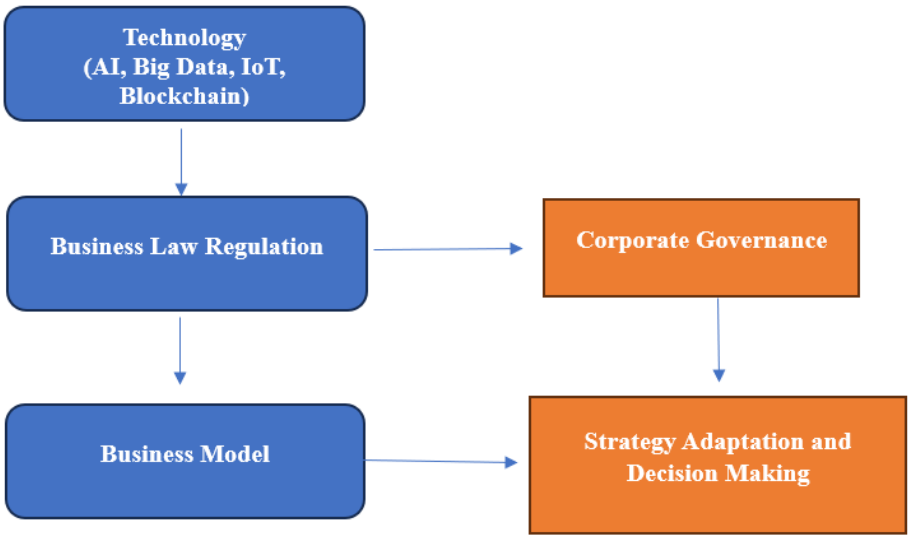

Figure 1. Conceptual Framework Diagram

D. Result And Discussion

Business Law Transformation

Key findings show that data protection regulations have undergone significant developments in the context of the Fourth Industrial Revolution, with the implementation of the General Data Protection Regulation (GDPR) in Europe being one of the most prominent examples. The GDPR, which came into force in May 2018, was designed to strengthen and unify data protection across the European Union, give individuals greater control over their personal data, and standardize regulations for companies operating in the region. The impact of this regulation is far-reaching, affecting not only companies based in Europe but also global companies that process the personal data of EU citizens.

In an interview with a legal expert experienced in data privacy, he stated, "*GDPR has changed the landscape of privacy regulation globally. Companies now have to not only meet technical requirements but also adapt their approach to data management as a whole. This is a major challenge, especially for companies operating across borders.*"

A regulator from the European Union also added that "*One of the biggest struggles we see is how companies handle the requirement to report data breaches within 72 hours. Many companies are still struggling with the speed and complexity required to comply with this rule. Compliance is not just about technology, it is also about the cultural changes that need to be made at the organizational level.*"

Legal experts also stress that while the GDPR provides a stricter legal framework, its implementation still poses challenges across EU member states, which have slightly different interpretations and enforcement of the law, "*There is variation in how the regulation is implemented across countries, and this creates*

additional challenges for companies who have to adapt their policies to accommodate these different interpretations," explains a lawyer who focuses on GDPR compliance.

Regulators stressed that GDPR compliance requires not only technical adjustments but also a cultural change in data management in companies, this includes raising awareness at the management level about the importance of data protection and integrating compliance policies into the overall business strategy. Legal informants also stressed that while the GDPR provides a more stringent legal framework, its implementation still faces challenges across EU member states, which have slightly different interpretations and enforcement of the law, these findings suggest that the GDPR has become a major turning point in data protection regulation in the digital era, providing new standards that encourage global companies to take personal data management more seriously. Implementing this regulation requires significant efforts from companies to achieve full compliance, with challenges continuing to emerge as technology advances and the business environment changes.

Business law has undergone significant adaptation to address the growing cybersecurity threats in recent years, as with the rapid advancement of technology and digitalization, the risk of cyberattacks on companies has become a major concern, forcing regulators to introduce new, stricter cybersecurity laws. One important step is the implementation of regulations that require companies to improve their data protection and system security, as well as to report cybersecurity incidents within a specified time. Regulations such as the NIS Directive in the European Union and the Cybersecurity Law in China are concrete examples of how business law has adapted to meet these challenges.

Companies across sectors have responded to the new regulations by strengthening their security infrastructure and updating internal policies to meet legal requirements. In the financial sector, for example, banks and other financial institutions have increased their cybersecurity systems to prevent potential data breaches that could harm customers and damage their reputations. In the technology sector, large companies such as Google and Microsoft have implemented stricter security standards and added additional layers of protection to protect user data from cyberattacks. In an interview with a Chief Information Security Officer (CISO) from a leading technology company with a branch in Indonesia, he said, "*The new regulations force us to not only enhance our security protocols but also update our entire approach to risk management. We must ensure that every aspect of our operations, from product development to customer service, adheres to strict security standards to protect user data*."

This adaptation is not only limited to technological improvements but also includes employee training and the establishment of new policies that are more proactive in preventing and responding to cyber threats. Companies are starting to implement cybersecurity training programs designed to raise employee awareness of cyber threats and how to deal with them. Major companies in the energy sector have integrated cybersecurity measures into their daily operations to protect critical infrastructure from attacks that could have a major impact on public safety and economic stability. Regulators are also increasingly emphasizing the importance of transparency and accountability in cybersecurity management. Many companies are now required to regularly report to relevant authorities on the steps they have taken to strengthen cybersecurity. In a further interview, the CISO added, "*Transparency is key. We must be ready to report on the security measures we are taking and fix any gaps that are found. It's not just about complying with regulations, it's also about building trust with customers and other stakeholders.*"

Business law has dynamically adapted to address cybersecurity threats, forcing companies to take a more holistic and proactive approach to protecting their data and systems, and ensuring compliance with evolving regulations. This adaptation, while challenging, has also pushed companies to develop more sophisticated and responsive security strategies in the face of complex cyber risks.

Implications for Business Models

Companies across industries have been working to change or evolve their business models to comply with new data protection regulations. The implementation of regulations such as GDPR in the European Union and CCPA in California have forced companies to prioritize user data protection as an integral part of their

business strategy. One significant change is the adjustment in the process of collecting, storing, and managing data, where companies must now ensure that the personal data collected is not only secured but also managed with transparency and by user consent.

Many companies have adopted business models that put data compliance at the forefront. For example, technology companies now offer additional features that allow users to manage their privacy preferences, as well as the option to delete their data from the company's systems. Meanwhile, e-commerce companies have tightened authentication procedures to ensure that only relevant and important data is stored, reducing the risk of data breaches that can lead to large fines and reputational damage. In an interview with the Chief Technology Officer (CTO) of a major technology company, he explained, "*Data protection regulations like GDPR have forced us to completely change our approach to data management. We have had to integrate compliance mechanisms into every aspect of our business model, from product design to customer service. One of the key steps we have taken is to build an IT infrastructure that allows us to quickly respond to user requests regarding their data, such as the right to access or delete their data.*"

This adaptation is not only happening in the technical aspects but also in the way, companies build relationships with customers. Companies are starting to emphasize transparency and trust as key elements in their interactions with customers, where they actively communicate their privacy policies and the measures they take to protect personal data. In the financial sector, banks and financial institutions have designed business models that allow them to remain competitive while ensuring that all transactions and customer data meet strict data protection standards.

Companies are also reassessing their partnerships and alliances with third parties to ensure that all business partners are also compliant with the new data protection regulations in addition to adjusting their business models, "*We have conducted a thorough audit of our partners to ensure that they are adhering to the same data protection standards that we are," the CTO added. "Where there are any discrepancies, we work with them to adjust our procedures or, in some cases, find new partners who can meet our standards*." These adaptations show that companies are not only seeking to comply with data protection regulations but also see compliance as an opportunity to strengthen customer relationships and build a competitive advantage in an increasingly privacy and security-sensitive market.

Tokopedia as one of the largest e-commerce companies in Indonesia, has made various adjustments to its business model to comply with increasingly stringent data protection regulations, especially with the development of the Personal Data Protection Law (UU PDP) in Indonesia which is expected to be similar to GDPR. As a company that operates in the digital sector and relies heavily on user data to run its business, Tokopedia realizes the importance of protecting customers' data. Along with increasingly stringent regulations, Tokopedia is strengthening its technology infrastructure to ensure that user data is not only secure but also managed by user consent and applicable laws. Tokopedia implements several key steps in its business model:

1. Strengthening Data Security: Tokopedia invests significant resources in strengthening cybersecurity to protect user data from external threats. They build a multi-layered security system that involves data encryption, strict monitoring, and threat detection systems.
2. Transparency and Compliance: Tokopedia updates its privacy policy and increases transparency in how user data is collected, used, and stored. They also provide easier access for users to manage their privacy preferences and submit data deletion requests.
3. Third-Party Partnerships and Compliance: Tokopedia also conducts audits on their business partners to ensure that they also comply with strict data protection standards. This is important to maintain customer trust and ensure that the entire business ecosystem complies with applicable regulations.

In an interview with Tokopedia's Chief Information Security Officer (CISO), he stated, "In recent years, we have seen a significant increase in awareness of the importance of data protection in Indonesia. The PDP Law has been a catalyst for us to review and change many aspects of our operations, including how we

handle user data. We are committed to ensuring that Tokopedia is not only compliant with regulations but also leads in terms of data protection in the e-commerce sector."

Tokopedia also focuses on internal education, where all employees receive regular training on data protection regulation compliance. This is done to ensure that all parties in the company understand the importance of protecting user data and complying with applicable regulations. Tokopedia's adaptations have resulted in greater trust from users, who feel safer in transacting on the platform. By complying with the new data protection regulations, Tokopedia not only avoided potential large fines but also built a reputation as a company that values user privacy. These steps have helped Tokopedia maintain its position as one of the market leaders in the e-commerce sector in Indonesia, even amidst fierce competition. This case study shows how companies in Indonesia, such as Tokopedia, have been able to adapt their business models to remain compliant with evolving data protection regulations, while also leveraging this compliance as a competitive advantage.

Digital companies around the world have faced a significant increase in cybersecurity risks, forcing them to proactively adapt their business models. One of the key steps taken by many companies is a change in their privacy policies, where they not only increase the security of user data but also increase transparency in how that data is managed. Privacy policies are no longer just long, hard-to-understand legal documents; many companies have started to design policies that are clearer, more concise, and more accessible to users, explaining their rights and how their data is used.

Digital companies are also developing new services designed with security as a top priority. For example, many social media platforms and e-commerce services have added features such as two-factor authentication, end-to-end encryption, and anomaly detection systems that can identify and mitigate cyber threats in real-time. Companies have introduced more secure payment services with the integration of biometric technologies, such as fingerprint scanners or facial recognition, to ensure that only authorized users can access their financial information.

In an interview with a cybersecurity strategist from a leading technology company, he explained, "*Adapting business models to mitigate cybersecurity risks is no longer just about strengthening IT infrastructure. It involves a holistic approach where every new product and service we develop must have security embedded in its design from the start. For example, when we launch a new cloud service, we ensure that all data processed through that platform is encrypted both in transit and at rest, and we implement strict access controls.*"

Digital companies are now focusing more on user education and awareness. They are launching educational campaigns that inform users about the importance of cybersecurity and provide guidance on how to protect their data, this not only helps reduce risks from the company's side but also empowers users to be part of the solution in keeping their data secure. Companies are also increasing their investments in advanced cybersecurity technologies in line with this shift, for example, the use of artificial intelligence (AI) and machine learning to monitor and analyze cyberattack patterns has become the new industry standard.

AI can help detect anomalies that may not be visible to human oversight, allowing companies to respond to threats quickly and more effectively. The business leader of a large e-commerce company also highlighted the importance of partnering with third-party security service providers. "*We can't do everything ourselves*," he said. "*That's why we partner with cybersecurity experts to ensure that all layers of our digital ecosystem are well protected. Our partners help us identify and respond to emerging threats, and ensure that we are always one step ahead in terms of security*." This discussion shows that digital companies today are not only reacting to cyber threats but are also proactively integrating security measures into the core of their business models. These steps include policy changes, new service development, and strategic collaboration, all aimed at protecting user data and maintaining trust in an increasingly complex digital era.

Implications for Corporate Governance

Companies across industries face significant challenges in adapting their governance to new and evolving regulations, particularly in the context of data protection and cybersecurity. One of the main challenges is the need to formulate new internal policies that are in line with the latest regulations, such as the Personal

Data Protection Act (UU PDP) in Indonesia or the General Data Protection Regulation (GDPR) in Europe. These policies must cover various aspects of a company's operations, from data management to security procedures, requiring adjustments that impact not only the IT division but also the entire organizational structure.

Changes in regulations also often require adjustments in the company's management structure. Many companies have to introduce new roles or strengthen existing ones, such as the Chief Compliance Officer (CCO), who is responsible for ensuring that all departments comply with applicable regulations, this challenge is often compounded by the need to integrate legal compliance with existing business strategies, without sacrificing innovation or operational efficiency. This requires a holistic and collaborative approach across multiple levels of management to ensure that compliance is not just an additional task but an integral part of corporate governance. In an interview with a Chief Compliance Officer (CCO) from a multinational company operating in Indonesia, he said, "*One of the biggest challenges we face is changing the company culture to recognize that regulatory compliance is not just the responsibility of the legal or compliance department, but a shared responsibility. We have to design internal policies that not only comply with the new regulations but are also easy to understand and implement by all employees, from the highest level to the lowest. This requires extensive training and ongoing communication*."

Changes in management structure are also needed to ensure effective legal compliance. Some companies have formed special compliance committees involving board members, senior managers, and legal experts to oversee the implementation of policies and ensure that the company stays within the bounds of the law, these committees serve as a link between legal policies and day-to-day operations, bridging the gap between regulations and business practices.

Many companies are also having to change their approach to risk management, as new regulations often carry higher compliance risks, with the potential for large fines in the event of a breach. Companies need to increase their focus on identifying and mitigating risks early on, and this requires more in-depth risk assessments and the development of more flexible governance frameworks that can adapt quickly to regulatory changes. A board member from a major technology company added, "*We recognize that regulation will continue to evolve as technology advances, and our challenge is to stay ahead of the curve. We need to ensure that our governance structure is flexible enough to accommodate these changes without hampering our ability to innovate. This means making strategic and sometimes difficult decisions, such as when to invest more resources in compliance and when to adapt our business model*."

This discussion illustrates how important it is to adapt corporate governance in the face of new regulations. The challenge is not only about complying with the law but also about how companies can integrate compliance into their business strategies to remain competitive and sustainable in the long term. Companies are increasingly using advanced technologies to strengthen their governance, and to increase transparency, efficiency and accountability in business operations. One technology that is gaining a lot of attention is blockchain, which is used to increase transparency in the supply chain, companies can record every step in the supply chain permanently and decentralized, from the source of raw materials to the finished product with blockchain, this allows all parties in the supply chain, including consumers, to trace the origin of the product and ensure that the business practices used are by ethical and environmental standards. For example, companies such as IBM and Walmart have implemented blockchain technology to track food products from farm to store shelf, ensuring the safety and quality of the product.

Companies are also increasingly adopting a more data-driven approach to decision-making as part of their efforts to strengthen governance. Data analytics technology enables management to gain deeper, real-time insights into operational performance, risks and market opportunities. By integrating big data and artificial intelligence (AI) into the decision-making process, companies can identify trends and anomalies more quickly, allowing them to respond more effectively to market or regulatory changes, for example, companies in the financial sector are using predictive analytics to manage financial risk and ensure compliance with increasingly stringent regulations.

Utilizing these technologies not only improves operational efficiency but also strengthens stakeholder trust, both internal and external. Increased transparency through blockchain can help build consumer trust, while a data-driven approach to decision-making can boost investor confidence by demonstrating that companies have strong controls over risk and business performance, these technologies play a critical role in helping companies meet the increasingly complex governance demands of the digital age.

Discussion

In analyzing the findings of this study, the results obtained indicate a strong correlation between the development of business law and technological innovation in the context of the Industrial Revolution 4.0. This finding is in line with existing theories, such as Rogers' theory of innovation diffusion, which states that the adoption of new technologies in business often triggers significant changes in the legal and regulatory framework. This study also highlights several important differences from previous studies, especially in terms of how business law adapts to disruptive technologies such as blockchain and AI.

In the context of data protection, the results of this study show that while regulations such as the General Data Protection Regulation (GDPR) in Europe have provided a clearer legal framework, their implementation still poses significant challenges for global companies, and this is consistent with findings from previous studies that suggest that GDPR compliance requires substantial changes to company policies and procedures, the study also shows that existing regulations often lag behind technological developments, creating gaps that can undermine legal certainty for companies—something that current regulations have not fully addressed.

Another finding of this study suggests that adapting business models to new regulations, as seen in corporate responses to cybersecurity regulations, requires a more integrative approach between law and technology. This reinforces the argument of legal adaptation theory, which states that laws must continually evolve to reflect changes in business practices. This study also adds a new dimension by highlighting the importance of collaboration between regulators, policymakers and companies in ensuring that regulation is not only reactive but also proactive in anticipating technological developments.

The relevance of these findings to business law practice is significant, especially in terms of how companies should prepare for more rapid and dynamic regulatory changes. The practical implication is that companies need to build more flexible and technology-oriented governance structures to manage regulatory risks and ensure ongoing compliance, the results of this study emphasize the importance of developing regulations that are more responsive and adaptive to technological innovation to support sustainable business growth for policymakers. The findings of this study not only support existing theory but also enrich the literature on the relationship between business law and technology in the digital age, they suggest that to remain relevant, business law theory must continue to evolve, reflecting the new realities brought about by technological innovation (Nainggolan, 2023; Pozdnyakova et al., 2019).

The findings of this study provide valuable insights for companies looking to improve their business models and governance in the era of Industrial Revolution 4.0. One key step that companies can take is to integrate advanced technologies, such as blockchain and artificial intelligence (AI), into their business operations to improve transparency, efficiency, and regulatory compliance, and by leveraging blockchain, companies can ensure that their supply chains are transparent and traceable, which not only increases consumer trust but also helps in meeting increasingly stringent regulatory requirements related to data protection and security.

Companies should adopt a more data-driven approach to decision-making, using data analytics to identify risks and opportunities early, this allows companies to adjust their business strategies quickly, ensuring that they remain competitive in an ever-changing market. The use of analytics technology can also strengthen corporate governance by providing management with real-time insights, which can be used to optimize operational performance and minimize compliance risks (George & George, 2020; Marbun et al., 2023).

These findings suggest that companies need to strengthen their management structures to support compliance with increasingly complex regulations, and this can be done by establishing a dedicated compliance committee or introducing a new role, such as a Chief Compliance Officer (CCO), who is responsible for ensuring that all internal policies are aligned with the latest regulations. Companies should consider conducting ongoing training for employees at all levels to enhance their understanding of the importance of compliance and how technology can be used to support this goal. Companies can not only improve their business models and governance, but also put themselves in a better position to face the challenges and opportunities brought by the Industrial Revolution 4.0, and they will be better prepared to adapt to rapid regulatory changes and ensure that they remain competitive and sustainable in the global market.

E. Conclusion

This study concludes that the Industrial Revolution 4.0 has driven significant transformations in business law, business models, and corporate governance, demanding rapid and strategic adaptation from companies to remain competitive and compliant with evolving regulations. Advanced technologies such as blockchain and AI not only open up new opportunities but also pose challenges in terms of legal compliance and risk management. Companies must integrate these technologies into their business models and governance, build more flexible management structures, and strengthen compliance mechanisms to deal with increasingly complex regulatory dynamics and ensure business sustainability in the digital era.

References

[1] Agrawal, A. (2022). Corporate Governance and Technology in Modern Times: A Digital Transformation in Effective Governance. *Issue 4 Indian JL & Legal Rsch.*, *4*, 1.

[2] Balashova, E. S., & Gromova, E. A. (2017). Agile transformation of the Russian sector of economy according to the legislative framework. *Journal of Advanced Research in Law and Economics*, *8*(3 (25)), 749–753.

[3] Bondarenko, V., & Aleshkovski, I. (2019). Social and economic development models in the digital transformation era. *Journal of Economic Science Research*, *2*(1).

[4] Braña, F.-J. (2019). A fourth industrial revolution? Digital transformation, labor and work organization: a view from Spain. *Journal of Industrial and Business Economics*, *46*(3), 415–430.

[5] Butler, J. (2020). Corporate Commitment to International Law. *NYUJ Int'l L. & Pol.*, *53*, 433.

[6] Eberhard, B., Podio, M., Alonso, A. P., Radovica, E., Avotina, L., Peiseniece, L., Caamaño Sendon, M., Gonzales Lozano, A., & Solé-Pla, J. (2017). Smart work: The transformation of the labour market due to the fourth industrial revolution (I4. 0). *International Journal of Business & Economic Sciences Applied Research*, *10*(3).

[7] Friska, M. (2023). The Role of the Government to Build Human Resources Management in Private Companies in Indonesia by Implementing Industrial Revolution 4.0 Transformation. *Proceeding of International Conference on Innovations in Social Sciences Education and Engineering*, *3*, 67.

[8] Gadinis, S., & Miazad, A. (2020). Corporate law and social risk. *Vand. L. Rev.*, *73*, 1401.

[9] George, A. S., & George, A. H. (2020). Industrial revolution 5.0: the transformation of the modern manufacturing process to enable man and machine to work hand in hand. *Journal of Seybold Report ISSN NO*, *1533*, 9211.

[10] Gojali, D. S. (2023). Identifying the Prevalence of Cybercrime in Indonesian Corporations: A Corporate Legislation Perspective. *International Journal of Cyber Criminology*, *17*(1), 1–11.

[11] Gong, G., Huang, X., Wu, S., Tian, H., & Li, W. (2021). Punishment by securities regulators, corporate social responsibility and the cost of debt. *Journal of Business Ethics*, *171*, 337–356.

[12] Handayani, M., Baridwan, Z., & Irianto, G. (2020). Transformation Corporate Social Responsibility Towards Industrial Revolution 4.0: Strategy and Challenges. *Brawijaya International Conference on Multidisciplinary Sciences and Technology (BICMST 2020)*, 45–49.

[13] Hang, N. T. (2021). Universal education development to enhance the quality of human resources in the context of digital transformation and industrial revolution 4.0. *The USV Annals of Economics and Public Administration*, *21*(1 (33)), 88–95.
[14] Jawad, M., Naz, M., & Maroof, Z. (2021). Era of digital revolution: Digital entrepreneurship and digital transformation in emerging economies. *Business Strategy & Development*, *4*(3), 220–228.
[15] Kershaw, D., & Schuster, E. (2021). The purposive transformation of corporate law. *The American Journal of Comparative Law*, *69*(3), 478–538.
[16] Kuru, K., & Yetgin, H. (2019). Transformation to advanced mechatronics systems within new industrial revolution: A novel framework in automation of everything (AoE). *IEEE Access*, *7*, 41395–41415.
[17] Kuteynikov, D., Izhaev, O., Lebedev, V., & Zenin, S. (2019). Transformation of public relations in the conditions of technological revolutions: Technology and innovation. *International Journal of Recent Technology and Engineering*, *8*(2), 3964–3971.
[18] Laptev, V. A. (2021). *Corporate Law: Legal Organization of Corporate Systems. Monograph*. " Издательство"" Проспект""".
[19] Libson, A., & Parchomovsky, G. (2022). Are All Risks Created Equal? Rethinking the Distinction Between Legal and Business Risk in Corporate Law. *BUL Rev.*, *102*, 1601.
[20] Lordan-Perret, R., Sloan, R. D., & Rosner, R. (2021). Decommissioning the US nuclear fleet: Financial assurance, corporate structures, and bankruptcy. *Energy Policy*, *154*, 112280.
[21] Lund, D. S., & Pollman, E. (2021). The corporate governance machine. *Colum. L. Rev.*, *121*, 2563.
[22] Manda, M. I., & Backhouse, J. (2017). Digital transformation for inclusive growth in South Africa. Challenges and opportunities in the 4th industrial revolution. *2nd African Conference on Information Science and Technology, Cape Town, South Africa*, 10–11.
[23] Marbun, D. D. P., Nurlaily, N., & Shahrullah, R. S. (2023). SOCIO-LEGAL PERSPECTIVES ON THE OMNIBUS LAW IN THE ERA OF INDUSTRIAL REVOLUTION 4.0: A CASE STUDY OF BATAM CITY. *Journal of Law and Policy Transformation*, *8*(1), 41–56.
[24] Mokyr, J. (2018). Editor's introduction: The new economic history and the Industrial Revolution. In *The British industrial revolution* (pp. 1–127). Routledge.
[25] Morrar, R., Arman, H., & Mousa, S. (2017). The fourth industrial revolution (Industry 4.0): A social innovation perspective. *Technology Innovation Management Review*, *7*(11), 12–20.
[26] Mtsweni, T. M. (2020). The Fourth Industrial Revolution: A Case for Educational Transformation. *Pretoria Student L. Rev.*, *14*, 321.
[27] Nainggolan, B. (2023). Legal Dynamics in the Digital Era: Navigating the Impact of Digital Transformation on Indonesian Society. *Law Development Journal*, *5*(4), 714–728.
[28] Pluta-Zaremba, A., & Szelagowska, A. (2021). Transformation of the economy: Towards era 5.0. In *The Economics of Sustainable Transformation*. Taylor & Francis.
[29] Popkova, E. G., Ragulina, Y. V, & Bogoviz, A. V. (2019). Fundamental differences of transition to industry 4.0 from previous industrial revolutions. *Industry 4.0: Industrial Revolution of the 21st Century*, 21–29.
[30] Pozdnyakova, U. A., Golikov, V. V, Peters, I. A., & Morozova, I. A. (2019). Genesis of the revolutionary transition to industry 4.0 in the 21st century and overview of previous industrial revolutions. *Industry 4.0: Industrial Revolution of the 21st Century*, 11–19.
[31] Prabowo, H., Rowa, H., Madjid, U., Johannes, A. W., & Sinaga, O. (2021). Transformation of Licensing Governance in Facing the Industrial Revolution 4.0 at Bandung City. *The Croatian International Relations Review (CIRR)*, *27*(87), 239–253.
[32] Putra, A. H. P. K. (2023). Transformation customers needs in the aspect of client value. In *Quality Management, Value Creation, and the Digital Economy* (pp. 82–98). Routledge.
[33] Reier Forradellas, R. F., & Garay Gallastegui, L. M. (2021). Digital transformation and artificial intelligence applied to business: Legal regulations, economic impact and perspective. *Laws*, *10*(3), 70.

[34] Romanova, O. A., & Kuzmin, E. (2021). Industrial policy: A new reality in the context of digital transformation of the economy. *Digital Transformation in Industry: Trends, Management, Strategies*, 13–23.
[35] Rudiyanto, F. S., Sachari, A., Sabana, S., & Pasaribu, Y. M. (2020). The Role of Technology and social transformation challenge in Industrial Revolution 1.0–4.0. *FoITIC*, 214–227.
[36] Sanden, G. R. (2020). Language policy and corporate law: A case study from Norway. *Nordic Journal of Linguistics*, *43*(1), 59–91.
[37] Schwab, K. (2017). *The fourth industrial revolution*. Crown Currency.
[38] Sukamto, B., Raihan, R., & Untoro, U. (2023). Legal Transformation in the Digital Era: Regulatory Adaptation and Innovation. *International Conference on "Changing of Law: Business Law, Local Wisdom and Tourism Industry"(ICCLB 2023)*, 289–296.
[39] Sullivan, M., & Kern, J. (2021). *The digital transformation of logistics: Demystifying impacts of the Fourth Industrial Revolution*. John Wiley & Sons.
[40] Syah, M. I., Piranda, K., Anes, M. R., & Hasan, Z. (2024). Sharia Economic Transformation in the Era of Industrial Revolution 4.0. *Rihlah Iqtishad: Jurnal Bisnis Dan Keuangan Islam*, *1*(2), 71–83.
[41] Wise, A. (2021). Corporate law and the business roundtable: Adding to the debate on shareholder primacy vs. stakeholder theory. *Cap. UL Rev.*, *49*, 499.
[42] Xu, M., David, J. M., & Kim, S. H. (2018). The fourth industrial revolution: Opportunities and challenges. *International Journal of Financial Research*, *9*(2), 90–95.
[43] Yalenios, J., & d'Armagnac, S. (2023). Work transformation and the HR ecosystem dynamics: A longitudinal case study of HRM disruption in the era of the 4th industrial revolution. *Human Resource Management*, *62*(1), 55–77.