


Exploring Future Prophecies: An Overview of the Late 20th Century into the 21st Century and the First Phase of Artificial Intelligence


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Abstract: The article examines predictions made at the end of the 20th century about contemporary society, assessing which have been confirmed or refuted at the start of the 21st century, and explores the impact of the first phase of Artificial Intelligence (AI). Considering contributions from renowned authors such as Bauman, Castells, Kahneman, Nicolelis, and Acemoglu, the study investigates forecasts related to liquid modernity, network society, information era, economic power concentration, and technological advances. The research aims to understand how these predictions influence current society and its policies through a comparative analysis of documents and literature drawing parallels between past forecasts and current developments. Among the findings, Bauman's prediction about volatility and freedom in liquid modernity is confirmed, noticeable in work flexibility and dissatisfaction with consumption. Castells accurately predicted organizational decentralization and global collaboration, despite persistent digital inequality. Rifkin forewarned of job reductions due to automation continuing to face challenges in the current market. Schwab emphasized the Internet of Things (IoT) impact, increasing economic inequality. Chomsky predicted the intensification of corporate power and media manipulation; Nicolelis highlighted the therapeutic applicability of brain-machine interfaces, though limited by ethical issues. Harari emphasized the transformative impact of AI and biotechnology, still holding authoritarian nuances. Acemoglu and Robinson emphasized the importance of inclusive institutions in preventing stagnation. The research highlights the need for ethical governance and regulation of technological innovations, emphasizing the urgency of evolving policies to ensure social equity in the era of technological advancement.

Keywords: Information Era; Contemporary Society; Artificial Intelligence; AI Governance; AI Regulation

Categories: H.3.1, H.3.2, H.3.3, H.3.7, H.5.1

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1 Introduction

In the last decades of the 20th century, several scholars predicted profound social, economic, and technological transformations that would shape the global landscape in the 21st century.

The theoretical framework presented offers a comprehensive overview of the predictions made at the turn of the 20th century about the global trends shaping contemporary society. Through the works of Bauman, Castells, Rifkin, Schwab, Chomsky, Nicolelis, Harari, Kahneman, and the analyses of Acemoglu and Robinson, it is possible to understand the complexity of the social, economic, and technological transformations underway.

This article aims to determine whether these predictions were confirmed throughout the first quarter of the 21st century and to what extent they shaped the contemporary society we experience today. Given the above, the main question we seek to answer is: What were the changes predicted for contemporary society at the turn of the 20th century, and which of these theories were confirmed and which were refuted throughout the first quarter of the 21st century?

To answer the proposed problem question, this study aims to analyze the predictions made at the time, verifying which theses have been confirmed and which have been refuted, both globally and in Brazil. The study allows understanding how these old predictions can inform, adjust, and influence innovative policies and strategies in facing future challenges highlighted by the works of the authors referenced here.

The methodological procedures adopted were bibliographic and documentary studies of the period in question, through a comparative analysis, which sought to highlight the main events and transformations that occurred or did not occur as predicted, providing a better understanding of current social, economic, and technological dynamics.

The justification for studying the predictions made at the end of the 20th century and their relation to our current reality is fundamental to understand the dynamics that influence contemporary society. Authors like Bauman, Castells, Rifkin, Schwab, Chomsky, Nicolelis, Harari, and researchers like Kahneman and Acemoglu offered robust analyses and predicted changes that, in many cases, dictated political actions and corporate strategies. By recognizing what has been confirmed or debunked, we can adjust understandings and preparations for the future, implementing more suitable policies and innovations to tackle presented challenges and opportunities. Furthermore, the research provides essential insights for academics, policymakers, and business leaders by highlighting trends, technological augmentations, and social transformations that continue to shape our constantly evolving world.

This article is divided into five parts: i) introduction; ii) methodological procedures; iii) development and arguments based on the Literature; iv) conclusions; v) suggestions for future studies.

2 Methodological Procedures

This study employed a predominantly qualitative methodological approach, based on bibliographical and documentary research [Gil, 2009]. The exploratory and comparative design adopted aimed to analyze and contrast predictions made at the end of the 20th century regarding the social, economic, and technological transformations

of the 21st century, particularly in the context of the early stages of artificial intelligence.

2.1 Selection Criteria and Justification for the Documents Analyzed

The selection of documents was based on criteria of academic relevance and theoretical influence in the field of prospective analysis and contemporary sociology. Works by authors internationally recognized for their productive contributions to understanding the dynamics of societal change at the turn of the millennium were selected. The document corpus included authors whose theses address crucial topics such as liquid modernity, the networked society, the impacts of automation and industrial revolutions, the concentration of corporate power, and the emergence of artificial intelligence. Specifically, the works of Zygmunt Bauman, Manuel Castells, Jeremy Rifkin, Klaus Schwab, Noam Chomsky, Miguel Nicolelis, Yuval Noah Harari, Daniel Kahneman, and Daron Acemoglu were considered. The selection of these thinkers aimed to ensure both the conceptual breadth and analytical depth necessary to verify the corroboration or refutation of their predictions throughout the first quarter of the 21st century.

2.2 Document and Content Analysis Process

The document analysis phase [Gil, 2019] began with immersion in the selected texts, systematically identifying and extracting each author's main theses, predictions, and arguments. Consequently, content analysis [Vergara, 2015] was employed to categorize and qualitatively interpret the collected information. This methodological process was structured in three stages: pre-analysis; material exploration; and processing and interpretation of results.

2.2.1 Pre-analysis

This consisted of a comprehensive reading of the bibliographic and documentary material to obtain a general understanding of the content and form the corpus for analysis.

2.2.2 Material Exploration

The recording units were identified, focusing on the authors' propositions about the future of society and technology. The categories of analysis were, in part, predefined based on the thematic axes that guided the study (e.g., labor market, institutions, social inequality, technology, and consciousness). However, an inductive component allowed other categories to emerge organically from the material itself, enriching the interpretation.

2.2.3 Results Processing and Interpretation

The predictions extracted were then compared with the developments and events realized in contemporary society up to the first quarter of the 21st century. This comparative analysis made it possible to classify each thesis as "confirmed" or "refuted," in addition to discerning nuances and challenges that were not fully anticipated in the original predictions.

The rigorous application of these methodological steps lent robustness to the interpretative process and supported the validity of the conclusions presented in this article.

3 Development and Arguments Based on the Literature

3.1 Global Trends: Predictions Made at the Turn of the 20th Century.

3.1.1 Liquid Modernity

Bauman [2000], in his work *Liquid Modernity*, argued that contemporary society would be characterized by fluidity and uncertainty, affecting areas such as emancipation, individuality, time and space, work, and community. He emphasized that this modernity would provide greater individual freedom, but would also bring challenges such as the lack of satisfaction due to unbridled consumption [Bauman, 2000; Bauman, 2007].

In the first area, emancipation, the author suggests that liquid modernity offers a two-faced emancipation: individual freedom accompanied by personal responsibility. In the second, individuality, liquid modernity is marked by fluidity and the incessant search for self-affirmation through consumption. In the third area, time and space, he describes a compression of these elements, driven by technologies that accelerate daily life. In the fourth area, work, liquid modernity is characterized by uncertainty and flexibility. In the fifth and final area, community, the author sees liquid modernity as ephemeral and often illusory [Bauman, 2000].

The premises established in *Liquid Modernity* continue to offer a useful framework for understanding contemporary social dynamics. While many of its predictions have been confirmed, especially regarding flexibility and volatility, other aspects, such as the devaluation of physical space and satisfaction through consumption, are more complex and subject to ongoing debate. Bauman's work remains relevant for reflecting on the challenges and opportunities of today's society [Bauman, 2000].

Bauman correctly highlighted the emphasis on individual responsibility in neoliberal societies and the search for autonomy [Bauman, 2000]. The link between consumption and identity is clear, as is the technology-driven compression of time and space [Bauman, 2000]. Flexibility and uncertainty in work have been validated, and the vision of ephemeral communities is confirmed by social networks [Bauman, 2005]. However, social fragmentation remains controversial; consumption does not lead to personal satisfaction [Bauman, 2007]. The value of physical space still prevails, and there are efforts to balance flexibility and job security. Ephemeral communities coexist with strong social cohesion in some cultures [Bauman, 2000; Putnam, 2000; Easterlin, 2000; Elliott, 2006; Featherstone, 2007; Standing, 2011; Rosa, 2013; Van Parijs & Vanderborght, 2017].

3.1.2 Network Society

Castells [1999], in **The Network Society**, described the rise of communication networks as the new structure governing social and economic organizations at the end of the 20th century. According to him, this change would foster greater decentralization and global collaboration, although challenges such as the digital divide remained

[Castells, 1999; Castells, 2000]. The author argues that the emergence of information and communication networks is reshaping the way organizations operate, creating a paradigm of a network society.

For Castells, the digital revolution and globalization have resulted in the formation of networks as the dominant structure of social and economic organization. He argues that these networks are more flexible and adaptable than traditional hierarchies, allowing for rapid response to environmental and technological changes. Network organizations are characterized by decentralization, collaboration, and interconnectivity, facilitated by information and communication technologies, and with flatter, less hierarchical structures [Castells, 1999].

He anticipated an increase in global collaboration, with companies and individuals working together across geographic boundaries. He highlighted the rise of the information society, where knowledge and information would be the main drivers of economic development. Finally, he predicted a transformation in the labor market, with an increase in flexible and remote work.

Castells's work continues to offer a valuable framework for understanding the dynamics of contemporary society, as new questions emerge, demanding continued reflection on the role of networks in shaping the future [Castells, 1999; Castells, 2009]. The information society has clearly emerged, with the knowledge economy driving growth and the demand for digital skills [Castells, 2010].

The predictions contained in the work *Network Society* about the transformation of social and economic structures into a network society were largely confirmed, especially in relation to organizational decentralization, where organizations adopted flat structures that improve agility and decision-making, exemplified by the agile methodologies that emerged later [Castells, 2000].

Global collaboration has become palpable, especially during the COVID-19 pandemic, with remote work and international partnerships [Castells, 2009; WEF, 2024].

However, challenges such as digital inequality and the environmental impact of digital technologies highlight areas where their predictions were less accurate or incomplete. These challenges persist, limiting inclusion and equity. The environmental impact of digital technologies, such as data center energy consumption and electronic waste, was not fully anticipated, creating ongoing concerns [Castells, 1999; Castells, 2000; Castells, 2004; Castells, 2009; Castells, 2010; WEF, 2024].

3.1.3 The End of Employment, the Third Industrial Revolution, and the Zero Marginal Cost Society

Rifkin, a renowned economist and futurist, has presented a series of theses over the past few decades that offer a critical and forward-looking view of the economic and social transformations resulting from technological advances.

Rifkin projected that the Third Industrial Revolution (TIR), driven by renewable and digital technologies, would change employment dynamics, while in Brazil, the implementation of renewable energy would mark a leadership role in this regard [Rifkin, 1995; Rifkin, 2011]. His ideas on the end of employment, the TIR, and the zero marginal cost economy have generated significant debate [Rifkin, 1995; Rifkin, 2011; Rifkin, 2014].

In his book **The End of Employment**, Rifkin argued that technological advances, especially automation and digitalization, would lead to a drastic reduction in traditional jobs. He predicted that many jobs would be eliminated as machines and software replaced human tasks, resulting in an economy where full employment would be unattainable [Rifkin, 1995]. According to him, automation and digitalization would replace many traditional jobs, such as in manufacturing and retail.

In his 2011 work "TRI," Rifkin proposes that the convergence of communication technologies, renewable energy, and intelligent transportation is transforming the global economy. He suggests that this revolution would bring about a decentralization of production and increased energy efficiency [Rifkin, 2011].

In 2014, the author published the book "The Zero Marginal Cost Society," arguing that the digital economy is leading to a situation where the marginal cost of producing goods and services approaches zero, challenging traditional economic models and promoting the rise of the "collaborative commons" [Rifkin, 2014].

Rifkin [1995; 2011; 2014] addresses the impact of technological revolutions on employment and the economy, reinforcing the importance of renewable energy, with Brazil playing a leading role. With a diversified energy matrix, Brazil excels in hydroelectric power production, which accounts for a large portion of its electricity generation. Furthermore, Brazil is a world leader in the production of biofuels, such as ethanol, derived from sugarcane. The expansion of solar and wind energy has also gained momentum, intensified by government policies and private investment [Rifkin, 2011; ANEEL, 2024; EPE, 2024]. Thus, with its strong position in renewable energy, Brazil exemplifies how nations can adapt and lead the transition to a more sustainable economy.

These works continue to inspire debates about how societies can adapt to technological and economic change, seeking a balance between innovation and inclusion [Rifkin, 1995; Rifkin, 2011; Rifkin, 2014; ANEEL, 2024; EPE, 2024]. His predictions about the impact of automation on traditional employment have been confirmed, although flexibility has not been absolute, and new economic challenges have emerged [Rifkin, 2014].

In 2011, in TRI, Rifkin predicted that the gig economy would reflect a more flexible labor market, while the adoption of renewable energy confirmed his vision, especially in Brazil [Rifkin, 2011]. In 2014, in *The Zero Marginal Cost Society*, Rifkin predicted that technological convergence, driven by the IoT, would promote interconnectivity and efficiency [Rifkin, 2014].

Rifkin's work on the end of employment, IRT, and the zero marginal cost economy offers provocative insights into the future of the global economy. While some of his predictions have been borne out, others face challenges and limitations.

However, the creation of new jobs in technology challenges the idea of absolute employment decline. Decentralization is limited, with centralization prevailing in many sectors. The transition to sustainable infrastructure faces cost challenges and political resistance. Furthermore, the zero marginal cost economy faces significant costs in physical sectors, and economic inequality persists [Rifkin, 1995; Rifkin, 2011; Rifkin, 2014; ANEEL, 2024; EPE, 2024].

3.1.4 Discussions at the World Economic Forum and the Fourth Industrial Revolution

Schwab's work introduced the notion of the Fourth Industrial Revolution (FIR), characterized by the intertwining of physical, digital, and biological technologies. Schwab saw potential for growth in this, but also warned against widening inequalities if these innovations were left unchecked [Schwab, 2016]. This revolution is marked by advances in artificial intelligence, robotics, the Internet of Things (IoT), biotechnology, and others.

The FIR presented global trends and offered a comprehensive overview of ongoing technological and social changes. While many of its predictions have been borne out, especially regarding the adoption of advanced technologies and renewable energy, significant challenges remain. Economic inequality and resistance to change are issues that need to be addressed to ensure that the benefits of the technological revolution are widely distributed. Schwab's work continues to inspire debate on how to disrupt these transformations in an inclusive and sustainable manner [Schwab, 2016].

Schwab [2016], in *A QRI*, predicted the evolution of artificial intelligence, automation, and IoT, confirming changes in the industrial and service sectors. The proliferation of connected devices makes an interconnected world tangible [Schwab, 2016]. Renewable energy transforms industry, and sustainability issues are recognized. However, economic inequality has increased, with new technologies primarily benefiting the already established. Resistance to the implementation of revolutionary technologies persists due to security and privacy concerns [WEF, 2024]. Geopolitical tensions and trade disputes undermine international cooperation. The transition to new work paradigms is uneven, leading to unemployment in certain areas [Schwab, 2016; IRENA, 2024; WEF, 2024].

3.1.5 Changes in Contemporary Society: by Chomsky, Nicolesis, and Harari

Chomsky highlighted the growing concentration of economic power and media manipulation. His predictions gained traction in a scenario where companies like Amazon and Google heavily influence global economic policies and decisions [Chomsky, 1988; Chomsky, 2000]. He is known for his criticism of neoliberalism, the concentration of power, and media manipulation. He predicted that these forces would shape society in significant ways, exacerbating inequalities and influencing democracy and human rights [Chomsky, 1988; Chomsky, 2000].

Chomsky warned about the growing concentration of power in the hands of large corporations and economic elites, which could undermine democracy. He highlighted the role of the media in shaping public opinion, often serving corporate and government interests. He predicted that neoliberal policies would increase social inequality, favoring the rich at the expense of the poor. He expressed concern about the erosion of human and civil rights, especially in contexts of state security and surveillance [Chomsky, 1988; Chomsky, 2000].

Chomsky's theses on changes in contemporary society offer a perceptive critique of the forces shaping the modern world. Social inequality has increased, with wealth concentrated among the richest. However, the erosion of human rights has not been absolute, with democratic resilience and social movements expanding rights [Piketty, 2014]. Technology has facilitated the promotion of human rights, and globalization has

fostered international collaboration in critical sectors, such as public health during the COVID-19 pandemic [Zuboff, 2019; Vinuesa, 2020; WEF, 2024].

Chomsky's work remains an essential reference for understanding the complex dynamics of power and social justice in contemporary society [Chomsky, 1988; Chomsky, 2000]. Additionally, Floridi [2024] argues that the ethical challenges of AI cannot be fully understood through exclusively technocentric or sociocentric approaches. Proposes sociotechnical pragmatism, integrating technological and social perspectives, to address the ethical complexity of AI.

Nicolelis [2011] highlighted the potential of brain-machine interfaces to revolutionize not only medicine but also the way humans interact with technology. He predicted that these advances could lead to significant changes in areas such as medical rehabilitation, communication, and even how we conceive of human consciousness and identity.

According to Nicolelis [2011], brain-machine interfaces would allow individuals with physical disabilities to recover motor and sensory functions. He anticipated that these technologies would transform medical rehabilitation, offering new possibilities for the treatment of neurological injuries and degenerative diseases. He suggested that direct integration between brain and machines could expand the boundaries of human consciousness, enabling new forms of communication and interaction.

Although technologies involving brain-machine interfaces have advanced, they still face ethical and technical limitations [Graumann, Allison & Pfurtscheller, 2010; Waldrop, 2021; Nicolelis, 2024]. To address these limitations, Taddeo, 2021] analyzes central ethical issues in the use of algorithms, highlighting problems such as opacity, biases, and lack of accountability, while also defending the need for multidisciplinary solutions — such as transparency, audits, and ethical regulation — to mitigate risks and promote fairer and more reliable algorithmic decisions in critical sectors.

Nicolelis's predictions about brain-machine interfaces and their implications for contemporary society have been largely confirmed in terms of their medical and rehabilitative potential. However, the expansion of human consciousness and the widespread adoption of these technologies face significant challenges that limit their full realization to date. Nicolelis's work continues to inspire innovation in the field of neuroscience, offering a vision of a future in which technology can help overcome human limitations [Donoghue, 2002; Graumann, Allison & Pfurtscheller, 2010; Nicolelis, 2011; Waldrop, 2021].

Harari outlined a scenario in which artificial intelligence and biotechnology would not only transform the economy but also provoke new ethical and social dilemmas. His ideas on surveillance and social manipulation are more relevant than ever [Harari, 2015; Harari, 2017].

Harari explores the impact of disruptive technologies, such as artificial intelligence and biotechnology, on society. He predicts that these innovations could redefine economics, politics, and the very nature of human life, ushering in a new era of ethical and social challenges [Harari, 2015; Harari, 2017]. He predicted that artificial intelligence and automation would transform the labor market, potentially leading to mass unemployment and the need for new forms of social organization.

According to Harari, biotechnology would enable genetic manipulation, creating the possibility of human enhancement and new ethical dilemmas. He warned of the growing power of data and surveillance, predicting that they could be used to control populations and manipulate behavior. He also highlighted that new technologies could

exacerbate social inequality, creating a divide between those who have access to technological improvements and those who do not [Harari, 2015; Harari, 2017].

Harari's predictions about changes in contemporary society have been largely confirmed, especially regarding the impact of artificial intelligence, biotechnology, and surveillance. However, some of his darkest predictions, such as insurmountable inequality and totalitarian control, face challenges and nuances in today's reality. The author's work continues to inspire debates about the future of humanity, highlighting the need for an ethical and inclusive dialogue about the implications of technological innovations [Harari, 2015; Harari, 2017; Ledford, 2016; Vinuesa, 2020].

Harari predicted that artificial intelligence and automation would transform the labor market, replacing jobs and expanding remote work [Harari, 2015; Harari, 2017]. Advances in machine learning and neural networks are revolutionizing several areas. Biotechnology, with Clustered Regularly Interspaced Short Palindromic Repeats (CRISPR), creates ethical dilemmas [Ledford, 2016]. Data-based surveillance validates privacy concerns [Vinuesa, 2020]. However, initiatives to expand access to technology and online education challenge the vision of insurmountable inequality. The idea of totalitarian control has not been fully confirmed, with democratic resilience and social movements protecting rights [Harari, 2017; Vinuesa, 2020].

3.1.6 Contemporary Society and the First Phase of Artificial Intelligence (AI)

A huge challenge for contemporary society is Artificial Intelligence (AI), which refers to computer systems capable of performing tasks that normally require human intelligence. This includes capabilities such as learning, reasoning, visual perception, speech recognition, and decision-making. AI is a promising technology with the potential to transform various sectors, from medicine to the financial industry, through automation and advanced data analysis [Kahneman, 2022; Nicolelis, 2024; Bloomberg, 2024].

Despite its potential, AI is not a universal solution to all technological or social problems. It lacks consciousness, emotions, or the ability to completely replace human judgment in all situations. AI is limited by its algorithms and training data, meaning it can introduce biases and errors if not managed properly [Kahneman, 2022; Nicolelis, 2024]. AI has become a valuable tool in decision-making, offering data-driven insights that aid in formulating business strategies. However, it is important that final decisions remain mediated by humans to ensure that ethical and contextual factors are considered [Kahneman, 2022]. Nicolelis, 2024] has been critical of AI's potential. He argues that, despite its capabilities, AI cannot replicate the complexity of the human brain and that overreliance on AI could lead to a devaluation of human skills.

Acemoglu and Robinson [2012], in *Why Nations Fail*, highlighted the crucial role of inclusive political and economic institutions in promoting sustainable growth. The effectiveness of these institutions continues to challenge global economies, demonstrating their continued impact over time [Acemoglu and Robinson, 2012; Acemoglu, 2024]. Discussions about the first phase of artificial intelligence highlight its transformative potential, but also its limitations and the need for ethical governance.

Kahneman [2022] predicted that AI would become essential in business decisions, surpassing humans in data analysis, process optimization, and reducing cognitive biases. However, AI has not eliminated the need for human judgment in complex decisions, especially in contexts that require empathy and ethics. Overreliance on AI

has led to significant errors, highlighting the need for continuous human oversight [Nicolelis, 2024].

Acemoglu and Robinson [2012] explain that economic and social development is strongly influenced by the quality of political and economic institutions.

Acemoglu argues that inclusive institutions promote innovation and growth, while extractive institutions lead to stagnation [Acemoglu and Robinson, 2012]. Inclusive institutions have resulted in economic success in countries such as those in the Scandinavian region. Automation has increased productivity, but also inequality and job displacement, with 5% of jobs threatened [Acemoglu, 2024; Frey & Osborne, 2017], primarily in repetitive and low-complexity tasks. This prediction has been borne out by the growing adoption of AI systems in sectors such as manufacturing and services [Acemoglu, 2024].

Some nations with extractive institutions, such as China, have defied predictions of stagnation. Reskilling initiatives mitigate the negative effects of automation, and a full-fledged economic revolution through AI has yet to materialize [Rodrik, 2000; Acemoglu, 2018; Acemoglu, 2024].

3.2 Summary of Predictions Made at the Turn of the 20th Century

In summary, this theoretical framework offers a rich and diverse panorama, essential for understanding the complex dynamics of the contemporary world and the future implications of technological and social innovations. The works discussed continue to inspire debate and reflection on how to navigate these transformations in an inclusive, ethical, and sustainable manner.

The following is a summary table of predictions made at the end of the 20th century, which are likely to occur in the 21st century, regarding changes in contemporary society, identifying those that have come true and those that have not.

| AUTHOR/WORK | CONFIRMED THESES | REFUTED THESES | CONCLUSION |
|---|---|---|--|
| Bauman, Z. (2001). <i>Liquid Modernity</i> . Bauman, Z. (2001). <i>The Individualized Society</i> . Bauman, Z. (2005). <i>Liquid Life</i> . Bauman, Z. (2007). <i>Consuming Life</i> . | Personal emancipation, consumerism and flexibility, temporal compression and virtuality, labor flexibility, online communities. | Positive social fragmentation, consumption does not lead to satisfaction, importance of physical space, job insecurity, social cohesion in some contexts. | The work remains relevant, but aspects such as the devaluation of physical space and consumption present nuances. |
| Castells, M. (1996). <i>The Network Society</i> . | Decentralization, global collaboration, knowledge economy. | Digital inequality, environmental impacts of digitalization. | The network society thesis remains applicable, but there are limitations due to digital inequality and environmental challenges. |

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|--|---|---|---|
| Rifkin, J. (1995). <i>The End of Work</i> . Rifkin, J. (2011). <i>The Third Industrial Revolution</i> . Rifkin, J. (2014). <i>The Zero Marginal Cost Society</i> . | Automation, expansion of renewable energies, reduction of marginal costs in digital products. | Absolute unemployment, limited decentralization, unresolved economic inequality. | Rifkin accurately predicts trends in automation and renewable energy but underestimates the market's adaptability and the challenges of inequality. |
| Schwab, K. (2016). <i>The Fourth Industrial Revolution</i> . | Artificial intelligence, IoT, growth of renewable energies. | Economic inequality, resistance to change. | Schwab accurately predicts technological trends but underestimates ethical and social challenges, such as inequalities and resistance to change. |
| Chomsky, N. (1988). <i>Manufacturing Consent</i> . Chomsky, N. (1999). <i>Profit Over People</i> | Concentration of power, media manipulation, social inequality. | Erosion of human rights, globalization. | Chomsky correctly predicts the concentration of power and inequality but underestimates democratic resistance and collaborative advances. |
| Nicolelis, M. (2011). <i>Beyond Boundaries</i> . Nicolelis, M. (2024). <i>Brazilian Scientist: AI Will Never Surpass the Human Brain</i> . | Rehabilitation and advances in brain-controlled prostheses. | Expansion of consciousness, widespread adoption. | Nicolelis is accurate in medical applications, but his predictions about the expansion of consciousness and widespread use are still limited. |
| Harari, Y. N. (2015). <i>Sapiens</i> . Harari, Y. N. (2017). <i>Homo Deus</i> . | AI and automation, genetic manipulation, surveillance. | Insurmountable inequality, totalitarian control. | Harari accurately identifies technological trends, but his darker predictions face nuances, especially regarding inequality and political control. |
| Kahneman, D. (2022). <i>Artificial Intelligence Will Make Better Decisions Than CEOs</i> , Says Nobel | Kahneman correctly predicted AI as essential in business decisions, | Kahneman underestimated the human need in complex decisions; AI failed to capture | Kahneman emphasizes AI's potential in decision-making but underscores the importance of human |

| | | | |
|---|---|---|---|
| Laureate in Economics. | surpassing humans in data analysis, optimizing processes, and reducing cognitive biases. | nuances, highlighting the importance of continuous human supervision and judgment. | judgment in complex and ethical contexts, influencing the balance between the two. |
| Acemoglu, D. and Robinson, J. A. (2012). <i>Why Nations Fail: The Origins of Power, Prosperity, and Poverty</i> . Acemoglu, D. (2024). <i>End of Employment with AI?</i> Bloomberg Línea. | Acemoglu was correct about inclusive institutions and automation: economies grow, but inequality and threatened jobs increase, especially in repetitive and low-complexity sectors. | Acemoglu underestimated the resilience of extractive nations like China and economic adaptation, while the economic revolution through AI has not yet fully materialized. | Acemoglu highlights institutions but underestimates resilience and adaptation. AI advances but does not replace executives; automation confirms impact on 5% of jobs. |

Table 1: Summary of Predictions and Theses on Changes in Contemporary Society:

Confirmed and Refuted

Source: Prepared by the authors.

4 Conclusions

The study of predictions made at the end of the 20th century has proven to be an indispensable tool for understanding the dynamics that currently influence contemporary society. A detailed analysis of the works of prominent theorists such as Bauman, Castells, Rifkin, Schwab, Chomsky, Nicolelis, Harari, Kahneman, and Acemoglu provided a comprehensive view of the social, economic, and technological changes predicted and effectively realized during the first quarter of the 21st century.

Bauman's concept of liquid modernity revealed the fluidity of modern societies and the complexity of issues such as individuality and the role of the fluid community in a rapidly changing world. Castells established the importance of networks and information, which facilitated globalization and increased international collaborations. Rifkin predicted a restructuring of the labor market in the face of digitalization and the TRI, and Schwab discussed the broad transformation through the QRI, exploring the fusion of the physical, digital, and biological as drivers of new forms of work and life.

It is noted, however, that not all predictions occurred as initially envisioned. Despite impressive advances, issues such as digital inequality for Castells or the ethical-technical challenges in AI for Nicolelis have proven to be both points of continuity and

disruption, indicating a complex path for the full utilization of these innovations for the benefit of humanity.

Chomsky's critique echoed through the decades, warning of media manipulations and concentrations of economic power, aspects that remain persistently relevant given the growing complexity of social media platforms controlled by Big Techs. Nicolelis and Harari, on the other hand, raised concerns about ethical dilemmas in biotechnology and artificial intelligence, provoking ongoing debates about consciousness and the ethics of automation. Acemoglu warns of high investments in AI solutions, which may lead to unmet expectations for returns.

Finally, the importance of inclusive institutions described by Acemoglu is highlighted for economic success and minimizing the negative social impacts of industrial revolutions on the labor market. This new century has shown the importance not only of predicting changes but of managing their ethical and social implications, promoting equitable development.

Reflecting on these predictions and the subsequent reality they envisioned, the study enables promising adjustments in corporate strategies, public policies, and the innovation agenda that can effectively respond to contemporary challenges, while aligning with the values of social justice and human progress.

5 Suggestions for Future Studies

Based on the results of the study "Exploring Future Prophecies," several directions for future studies have been suggested that have the potential to deepen the understanding of contemporary challenges.

First, it is recommended to investigate how to develop and implement inclusive institutions in various political and economic contexts to mitigate inequalities and foster sustainable growth, as observed by Acemoglu and Robinson.

Second, there is a need for a critical analysis of the relationship between automation and unemployment, assessing how it reduces traditional jobs and creates opportunities in emerging sectors, as predicted by Rifkin.

Another crucial aspect is exploring the integration of artificial intelligence in decision-making, highlighting ethical challenges and the need for human oversight, a concern emphasized by Kahneman.

Moreover, it is essential to examine the transition to renewable energy sources, focusing on effective policies to sustain this change, given Brazil's role in renewable energies highlighted by Rifkin.

Studying the effect of emerging technologies on digital inequality and developing strategies to ensure equitable access is also imperative, following the warnings of Castells.

Another important area is the advancement of brain-computer interfaces and their ethical, social, and legal implications, as discussed by Nicolelis.

Finally, investigating the role of social networks in global economic power, aligned with Chomsky's concerns about the impact of Big Techs on public policies, also proves necessary, as does governance in AI, without overlooking the regulation of AI use.

Such studies have the potential to expand understanding and assist in forming strategies for future challenges amid rapid technological and social evolution.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

References

- [Acemoglu, 2018] Acemoglu, D. (2018). The Race Between Man and Machine: Implications of Technology for Growth, Factor Shares, and Employment. *American Economic Review*, vol. 108, no. 6, 2018, pp. 1488-1542.
- [Acemoglu, 2024] Acemoglu, D. (2024). The End of Jobs with AI? For Daron Acemoglu, 5% Are Really Under Threat. Bloomberg Line. Available at: <https://www.bloomberglinea.com.br/internacional/economista-daron-acemoglu-diz-que- apenas-5-dos-empregos-sao-amecados-pela-ia/>. Accessed on: October 6, 2024.
- [Acemoglu and Robinson, 2012] Acemoglu, D. and Robinson, J. (2012) *Why Nations Fail: The Origins of Power, Prosperity, and Poverty*. Elsevier.
- [Bauman, 2000] Bauman, Z. (2000). *Liquid Modernity*. Jorge Zahar, Editor.
- [Bauman, 2005] Bauman, Z. (2005). *Liquid Life*. Jorge Zahar, Editor.
- [Bauman, 2007] Bauman, Z. (2007). *Life for Consumption: The Transformation of People into Commodities*. Jorge Zahar, Editor.
- [Bloomberg, 2024] Bloomberg. (2024). The Age of Artificial Intelligence and Its Economic Impact. Bloomberg Opinion. Available at: <https://www.bloomberglinea.com.br/2024/10/27/por-que-a-adocao-da-ia-na-economia-sera-mais-irregular-do-que-se-imagina/>. Accessed on October 6, 2024. C
- [Castells, 1999] Castells, M. (1999). *The Network Society. The Information Age: Economy, Society, and Culture. Volume I*. São Paulo: Paz e Terra.
- [Castells, 2000] Castells, M. (2000). Materials for an exploratory theory of the network society. *British Journal of Sociology*, 51(1), 5-24.
- [Castells, 2004] Castells, M. (2004). *The Information Age: Economy, Society, and Culture*. Oxford: Blackwell.
- [Castells, 2009] Castells, M. (2009). *Communication and Power*. Paz e Terra.
- [Castells, 2010] Castells, M. (2010). *The Rise of the Network Society: The Information Age: Economy, Society, and Culture. 2nd Edition*. Oxford: Wiley-Blackwell.
- [Chomsky, 1988] Chomsky, N. (1988). *Manufacturing Consent: The Political Economy of the Mass Media*. Pantheon Books.
- [Chomsky, 2000] Chomsky, N. (2000). *Easy Profits: The True Face of Neoliberalism*. Rio de Janeiro: Bertrand Brasil.
- [Donoghue, 2002] Donoghue, J. (2002). Connecting Cortex to Machines: Recent Advances in Brain Interfaces. *Nature Neuroscience*, vol. 5, pp. 1085–1088.

- [Easterlin, 2001] Easterlin, R. A. (2001). "Income and Happiness: Towards a Unified Theory." *The Economic Journal*, 111(473), 465-484.
- [Elliott, 2006] Elliott, A., & Lemert, C. (2006). *The New Individualism: The Emotional Costs of Globalization*. Unesp.
- [EPE, 2024] Energy Research Company (EPE) (2024). *National Energy Balance Summary Report*. Available at: www.epe.gov.br. Accessed on: October 16, 2024.
- [Featherstone, 2007] Featherstone, M. (2007). *Consumer Culture and Postmodernism*. Nobel Press.
- [Floridi, 2024] Floridi, L. (2024). *Competing narratives in AI ethics: A defense of sociotechnical pragmatism*. *AI & Society*. Advance online publication. DOI: <https://doi.org/10.1007/s00146-024-02128-2>.
- [Frey, 2017] Frey, C. and Osborne, M. (2017). *The Future of Employment: How Susceptible Are Jobs to Computerization? Technological Forecasting and Social Change*, vol. 114, 2017, pp. 254-280.
- [Gil, 2019] Gil, A. C. (2019). *Methods and techniques of social research*. 1st ed. São Paulo: Atlas.
- [Grimann; Allison; Pfurtscheller, 2010] Grimann, B.; Allison, B.; Pfurtscheller, G. (2010). *Brain-Computer Interfaces: Revolutionizing Human-Computer Interaction*. Springer.
- [Harari, 2015] Harari, Y. (2015). *Sapiens: A Brief History of Humankind*. HarperCollins.
- [Harari, 2017] Harari, Y. (2017). *Homo Deus: A Brief History of Tomorrow*. HarperCollins.
- [IRENA, 2024] IRENA. (2024). *Renewable Capacity Statistics*. Available at: www.irena.org. Accessed on: October 6, 2024.
- [Kahneman, 2022] Kahneman, D. (2022). *Artificial Intelligence Will Make Better Decisions Than CEOs, Says Nobel Prize Winner in Economics*. Bloomberg Line. Available at: <https://www.bloomberglines.com.br/2022/08/15/inteligencia-artificial-tomara-decisoes-melhores-que-ceos-diz-nobel-de-economia/>. Accessed on October 6, 2024.
- [Ledford, 2016] Ledford, H. (2016). *CRISPR: Gene Editing Is Just the Beginning*. *Nature*, vol. 531, 2016, pp. 156-159.
- [ANEEL, 2024]. National Electric Energy Agency (ANEEL). (2024). *Electric Energy Atlas of Brazil*. Available at: www.aneel.gov.br. Accessed on: October 16, 2024.
- [Nicoletis, 2011] Nicoletis, M. (2011). *Beyond Our Self: The New Neuroscience Uniting Brain and Machines—and How It Can Change Our Lives*. Companhia das Letras. 1.
- [Nicoletis, 2024] Nicoletis, M. (2024). *Brazilian Scientist: AI Will Never Surpass the Human Brain*. Available at: <https://blog.automacaoemlimites.com.br/inteligencia-artificial-cerebro-humano/> Accessed on: November 20, 2024.
- [Piketty, 2014] Piketty, T. (2014). *Capital in the Twenty-First Century*. Rio de Janeiro: Intrínseca.
- [Putnam, 2000] Putnam, R. D. (2000). *Community and Democracy: The Experience of Modern Italy*. Getúlio Vargas Foundation.
- [Rifkin, 1995] Rifkin, J. (1995) *The End of Jobs*. São Paulo: Makron Books.
- [Rifkin, 2011] Rifkin, J. (2011). *The Third Industrial Revolution*. São Paulo: M. Books.

- [Rifkin, 2014]. Rifkin, J. (2014). *The Zero Marginal Cost Society*. São Paulo: M. Books.
- [Rodrik, 2000]. Rodrik, D. (2000). Institutions for High-Quality Growth: What They Are and How to Acquire Them. *Studies in Comparative International Development*, vol. 35, no. 3, 2000, pp. 3-31.
- [Rosa, 2013]. Rosa, H. (2013). *Social Acceleration: A New Theory of Modernity*. Unesp Press.
- [Schwab, 2016]. Schwab, K. (2016). *The Fourth Industrial Revolution*. São Paulo: Edipro.
- [Standing, 2011]. Standing, G. (2011). *The Precariat: The New Dangerous Class*. Literary Autonomy.
- [Taddeo, 2021]. Taddeo, M. (2021). The ethics of algorithms: Key problems and solutions. *AI & Society*, 38, 307–314. DOI: <https://doi.org/10.1007/s00146-021-01154-8>.
- [Van Parijs & Vanderborght, 2017]. Van Parijs, P. & Vanderborght, Y. (2017). *Basic Income: A Radical Proposal for a Free Society and a Sound Economy*. Martins Fontes Press.
- [Vergara, 2015]. Vergara, S. C. (2015). *Research Methods in Administration*. 6th ed. São Paulo: Atlas.
- [Vinuesa, 2020]. Vinuesa, R. (2020). The Role of Artificial Intelligence in Achieving the Sustainable Development Goals. *Nature Communications*.
- [Waldrop, 2013]. Waldrop, M. (2013). Neuroprosthetics: Once More, with Feeling. *Nature*, vol. 503, pp. 180–182.
- [WEF, 2024]. World Economic Forum (WEF). (2024). *The Global Risks Report*. Available at: www.weforum.org. Accessed on: October 6, 2024.
- [Zuboff, 2019]. Zuboff, S. (2019). *The Age of Surveillance Capitalism*. Public Affairs.