

The Sociology of Artificial Intelligence: Transformations in the Human– Technology Relationship

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Abstract:

In the context of rapid digital transformation, artificial intelligence (AI) has become a significant turning point in contemporary social life. Rather than being merely a set of technological tools, it has become an active agent within the social fabric, imposing a new interactive pattern between humans and technology. This prompts us to examine this topic from a sociological perspective, in order to improve our understanding of how AI reshapes the social and psychological structures of modern society. This research paper aims to explore sociological approaches to interpreting the dynamics that govern the relationship between humans and technology, and to clarify aspects of social change within the network of human-machine interactions.

Keywords: artificial intelligence, technology, social transformation, human interaction, reification, technological society, digital sociology.

Introduction:

In recent decades, the world has witnessed an unprecedented acceleration in technological development, particularly in the field of artificial intelligence (AI). AI has become one of the most significant technological achievements of modern times. AI has transformed the world into a global village, transcending its role as a mere scientific product or set of tools and applications to become a powerful force deeply embedded in the structure and culture of contemporary societies. The discourse surrounding AI is no longer confined to digital tools or technical applications; it has asserted itself within social interactions and relationships, reshaping social patterns and perceptions of various concepts. Furthermore, AI is increasingly present in many different fields.

The sociology of artificial intelligence is not just the study of technology; it analyses the social and cultural dimensions of these changes by examining the role and status that these applications have come to occupy in human life. Therefore, studying this phenomenon enables us to interpret the interrelated transformations imposed by this development.

Study problem:

Technological changes to human interaction have necessitated an expansion of social analysis, which has traditionally focused on examining patterns in social relationships. This analysis now encompasses the new interactive patterns that these changes have created.

The new interactions between humans and machines introduce a novel perspective on technology, transforming it from a mere human-made tool into an active entity within this system.

The central issue that emerges from this is:

What is the nature of the transformations that have occurred in the relationship between humans and technology in light of the proliferation of artificial intelligence? How can these transformations be approached from a sociological perspective?

This question opens the door to studying the potential negative effects that may arise from this transformation.

Sub-questions:

1. What forms do these transformations take?
2. What are the social implications of artificial intelligence in areas such as family life, education, and healthcare?
3. What future challenges does artificial intelligence present?

Study objectives:

2. This study aims to:

1. Analyse the contemporary sociological transformations that have occurred in human-technology interaction patterns amidst the development of artificial intelligence.
2. Understand the social dynamics imposed by technology on human-AI interactions.
3. Assess the impact of virtual interaction on human relationships.
4. Observe changes in societal representations of social concepts.
5. Review the potential impact of artificial intelligence on the social fabric and symbolic structure of society.

3. Importance of the study:

This study is significant because it focuses on an important topic in the social lives of individuals and communities in the digital technology era. It helps to:

1. - understand the social perspective on the term ‘artificial intelligence’ beyond a technical approach to this phenomenon.
2. encourage a re-evaluation of the relationship between humans and technology overall.
3. Consider the social impact of artificial intelligence on human life.
4. Open up avenues for exploring the challenges posed by these technologies in the future.

4. Theoretical and Conceptual Framework of the Study:

Artificial intelligence (AI) is widely regarded as one of the most significant developments in contemporary society. It has become indispensable due to its pervasive integration into daily life.

4.1 Concept of artificial intelligence:

The concept of artificial intelligence has its roots in ancient times, emerging alongside machinery. As science advanced and technology encroached upon human life, the need for such technologies became urgent, leading to the development of mechanisms that mimic human thought.

Linguistically, the term ‘artificial intelligence’ can be defined as a combination of ‘intelligence’, referring to quick-wittedness, adaptability, and analytical ability, and ‘artificial’, denoting something created or designed by humans. Thus, AI represents human-like intelligence or quick thinking that has been manufactured and refined by humans.

4.2 Definition of Artificial Intelligence

The definition of artificial intelligence varies across theoretical approaches and disciplines. John McCarthy was the first to define the term as “the science and engineering of making intelligent machines, particularly computer programs capable of simulating human behavior.” AI is a field within computer science focused on building systems that can perform tasks typically requiring human intelligence, such as learning, reasoning, and self-improvement. It is also referred to as machine intelligence (Kamel, 2023, p. 4).

Additionally, AI is defined as the branch of computer science that studies and develops computational organisations exhibiting certain forms of intelligence. These systems can draw useful conclusions about posed problems and understand natural language. AI is also described as the capability of machines to mimic human thought processes such as reasoning, discovery and learning from past experiences (Shelly, 2023, p. 84).

Michael Heinlein and Andreas Kaplan define AI as a system’s ability to accurately analyse external data, comprehend it, learn from it, and utilise this knowledge to flexibly achieve specific goals and tasks.

In computer science, AI is viewed as a technology that enables devices to analyse and simulate human communication and behaviour in their simplest forms. AI relies on technology or systems that perform tasks by emulating human cognitive abilities, and it often evolves and improves based on the data it gathers (Babouq & Al-Qur’an, 2024, p. 1020).

In sociology, AI is considered a social actor that can reconstruct and reshape human interactions by intervening in social relationships within contemporary human systems through algorithms. AI imposes digital patterns on individuals’ daily lives, including in areas such as family, education, healthcare, and identity and knowledge. Thus, AI is also a social phenomenon characterised by its technological nature;

however, it also carries social dimensions and issues that prompt a re-examination of all concepts, including humanity itself.

4.3 Concept of Technology

The concept of technology encompasses various developments in information technology, network communication and electronic devices.

The concept of technology encompasses various developments in information technology, network communication and electronic devices. It can be summarised in three main points:

1. Some define it as the innovations and physical devices created by humans for human benefit.
2. Others view it as the activity itself, whether manual or cognitive.
3. A third perspective sees technology as the interaction between humans and their environment, characterised by mutual influence (Maamar & Zighmi, 2022, p. 320).

4.4 Human relationships

Human relationships are dynamic interactions that enable individuals to engage with their environment and encompass psychological, ethical and social dimensions. Technological advancements have significantly changed the nature of social relationships in human life. These interactions now extend beyond human-to-human relationships to include human-machine interactions.

5. Sociological Approaches to Analysing the Human–Technology Relationship in the Context of Artificial Intelligence

A theoretical framework is essential for analysing sociological approaches and understanding emerging relationships between humans and technology in the context of artificial intelligence. To achieve this, we must consider several sociological theories that contribute to the analysis of these changes.

5.1 Modernisation theory

One of the earliest approaches aimed at explaining the changes that have occurred in traditional societies, particularly with regard to scientific and technological advancements, is modernisation theory. These developments have led to radical transformations in human interactions. Max Weber regarded technology as one of the most significant developments in modern society, whereas Émile Durkheim believed that social systems change in response to the introduction of technology and machinery. One of the most notable reflections of technological advancement is the evolution occurring within the social system.

5.2 Social Construction of Technology (SCOT):

This theory emphasises that technology is inseparable from society and is generated within the social, human and cultural context of individuals. Prominent figures in this theory include Pinch and Bijker. Therefore, artificial intelligence is shaped by the individuals responsible for its production and design, who create it according to their own needs, desires and areas of application.

5.3 Technological Determinism

This theory posits that technology is the primary driver of change within society, influencing social interactions and shaping the cultural norms that are shaped by habits and traditions. A key proponent of this view was Marshall McLuhan, who asserted that technology reshapes social structure and consciousness. Consequently, artificial intelligence serves as a catalyst for restructuring relationships, interactions and roles within society.

5.4 Actor-Network Theory (ANT):

This theory, notably advanced by Bruno Latour, views the relationship between humans and technology as a networked one. From this perspective, machines are not just components of technology; they are social actors that can influence society. The relationship between individuals and machines is interactive and participatory, enabling them to collaborate towards a shared objective.

6. Transformations in the Human-Technology Relationship

The relationship between humans and technology is one of the most debated dualities in human history. It is not limited to mere interaction between humans and the machines they create for convenience; rather, it has evolved into an integral part of life. With the advent of the digital revolution, this relationship has become more interactive, merging humans and machines into everyday life. Some of the key features of this transformation include:

- Integration of AI in daily life: AI systems are becoming increasingly embedded in various aspects of human activities, enhancing efficiency and decision-making.

Shifting Roles: The roles of humans in various sectors are changing, with AI taking over tasks traditionally performed by people.

- Enhanced interaction:

There is growing interdependence between humans and machines, leading to new forms of communication and collaboration.

- Cultural Impact: Technology influences cultural practices and social norms, reshaping how individuals perceive their identities and communities.

These changes highlight the significant influence of technology on human relationships and societal structures.

6.1 From use to dependence

From adaptation and control to reliance and domination.

Throughout history, humans have sought to simplify and enhance their lives through inventions. In ancient civilisations, people focused on adapting to their environment rather than seeking radical change. They strove to improve their circumstances within seemingly unchangeable conditions (Al-Sharif, 2024). From simple hunting tools to subsequent inventions in various fields, humans have traditionally shaped and controlled machines according to their needs, including agricultural and industrial tools, as well as transportation methods.

This relationship was characterised by human control and adaptation until the advent of artificial intelligence technologies, which have become integral to human life. The development of applications, robots and machine translation has led to an increased reliance on machines, particularly in critical areas such as healthcare, education, communication and security.

While the initial premise of the relationship between humans and technology was that these tools would facilitate life, technology has come to dominate human existence. For example, AI now plays a vital role in medical diagnostics and analysis, as well as in facilitating social communication via devices such as the internet and smartphones.

Consequently, the loss of traditional skills, such as the ability to read maps manually or write by hand, has become common in the digital age and could affect our cognitive and expressive abilities. More concerning still is the growing prevalence of digital addiction, whereby many individuals spend excessive hours on their smartphones, often without fully realising the negative psychological and social consequences of this behaviour. This can lead to diminished human relationships and increased feelings of isolation and anxiety (Aburawy, 2025). In this context, humans risk becoming subservient to technology.

6.2 From control to participation: Changing Social Roles

Examining various stages in the history of technology reveals that humans and their tools form a collaborative system (Volkov, 1979, p. 18). However, the Industrial Revolution brought about changes that transformed human societies from simple, traditional communities into complex industrial ones. In these societies, humans remained in control of technology, despite the negative consequences that accompanied this control.

As technology has advanced and we have transitioned to a social intelligence society, technology has gradually become a crucial partner in our daily lives. We now experience anxiety and disorientation in its absence. Millions of people rely heavily on social media not only to connect with friends and family, but also to receive news and form opinions. Global Positioning Systems (GPS) have become our indispensable digital compasses, guiding us even on the simplest of journeys.

However, this excessive reliance has generated new challenges that could undermine essential human skills and have a negative impact on our psychological and social well-being (Aburawy, 2025). Control over these technologies, especially modern ones, is slipping away from us. Artificial intelligence is starting to replace human intelligence, making shared decision-making a common occurrence in daily social life and within institutions.

This participatory lifestyle compels us to reconsider the structure of society as a whole, including the concepts of decision-making and responsibility. It also urges us to regulate the ethics of engaging with artificial intelligence and technology in general.

6.3 Artificial Intelligence: From Machine to Social Actor:

The perception of social actors is shifting from traditional to postmodern sociology. Historically, terms such as ‘actor’ were primarily used to describe individuals or human groups. However, modern approaches, particularly Actor-Network Theory, expand this concept to encompass tools, machines, applications and technological means that can exert influence. Technology is no longer merely a facilitator of human life; it has become an active participant in social processes, capable of having both positive and negative impacts on daily life. Technology shares events with humans, participates in decision-making and influences responses.

These transformations compel us to reconsider and reorganise the social structure, regulating the relationship between humans and technology — particularly artificial intelligence. While this relationship should be confined to practical uses and applications, we must also strive to redefine social and value concepts, such as citizenship and identity, independently of technology.

6.4 Changes in communication and interaction patterns: From Object Relations to Symbolic Interactions:

Developments in artificial intelligence and technological interventions that are increasingly influencing daily life have significantly transformed the human relationship with technology. This relationship has evolved from simple usage, which is designed to solve problems through commands and responses, to a symbolic interaction that reflects the depth of human connection with machines, whether psychological, social or cultural.

Humans no longer engage with machines as inert objects, but as social entities. This change is particularly evident in the advancements of smart technologies, such as applications and voice assistants, and in interactions with chatbots, which can provide medical and psychological consultations. These technologies now exhibit human-like traits such as intelligence, understanding, communication ability and emotional responses. This evolution has created a new dynamic in the relationship between humans and machines, with the latter taking on the roles of digital friends or personal assistants.

In this context, it can be asserted that, in the era of technology and artificial intelligence, humans have moved beyond a purely utilitarian approach to technology, entering into a more interactive partnership with it. This reflects transformations in social relationships within human society, where even human-to-human interactions have changed. Some individuals may feel isolated within a human community, leading them to shift their affiliations from real-world connections to digital spaces.

7. The Future of the Human–Technology Relationship

Ongoing technological, artificial intelligence and robotic developments are making the relationship between humans and technology increasingly complex. This

relationship has evolved beyond mere utilisation to encompass a form of digital self-embodiment. The metaverse, for example, is not just an interactive virtual world; it enables us to create digital avatars that represent our presence and interactions within this virtual realm. These avatars can closely resemble us or differ significantly, raising profound questions about the impact of this digital embodiment on our true identities (Aburawy, 2025).

The challenges facing the future relationship between humans and technology extend beyond the concept of a ‘global village’. They prompt critical questions, such as:

How will we maintain human values, standards and social constructs in the future?

How will we regulate the relationship between humans and machines, particularly artificial intelligence?

How can we ensure that our real lives prevail over the virtual existence imposed by technology?

Addressing these questions will be essential for navigating the complexities of our evolving relationship with technology.

8. Social implications of technology:

The social transformation imposed on the social fabric of human life by technology has not merely been an evolution of tools or machines; it has fundamentally altered the nature of human and social interactions. The communication loop has shifted from the tangible, physical world to a boundless virtual realm. This has affected the overall structure of social systems, including traditional institutions such as the family and education systems, reshaping roles and modes of communication and interaction.

8.1 Impacts of Technology and Artificial Intelligence on Society:

Technology plays a crucial role within society, with digital advancements leading to changes in its structural frameworks. It has facilitated the reconstruction of roles and even altered concepts, alongside significant transformations in various fields, such as the job market. This has resulted in the creation of new opportunities and professions, while simultaneously rendering many obsolete due to automation, leading to terms like “digital unemployment” and “technological illiteracy.” Moreover, technological advancements have influenced social systems like education, upbringing, and healthcare.

However, alongside these positives, there are also many negatives. As society has evolved, so have communication and interaction patterns among its members, replacing tangible social settings with virtual ones.

8.2 Impacts of artificial intelligence on the family (privacy, education and upbringing).

The use of technology and AI applications within families has led to a noticeable change in communication patterns. These technologies play an increasingly significant role in shaping family dynamics and affecting relationships. Upbringing is

no longer confined to parents or schools; these applications have become essential partners in child development and behaviour guidance. Mobile phones, tablets, and voice assistants contribute to this transformation by:

1. Facilitating access to information:

Children can easily access a wealth of information, which can enhance learning but may also lead to misinformation.

2. Enhancing communication:

Families can maintain connections across distances, but this can reduce face-to-face interaction.

3. Influencing behaviour:

Devices often serve as companions, shaping children's habits and social interactions.

4. Providing educational support:

AI applications can assist with learning and homework, providing children with additional resources.

These changes highlight the significant impact of technology on family life and raise questions about privacy, parental involvement, and the broader process of child rearing.

8.3 Social communication and interaction have been greatly facilitated by these applications within families.

Key Areas of Impact:

1. Family Organization and Planning: These apps help families manage their schedules, appointments, tasks, and daily activities.

2. Health and Fitness: Many applications support maintaining physical fitness, such as healthy eating apps and heart rate monitors.

3. Learning and Personal Development: Numerous apps provide customized educational content tailored to individual needs, improving skills and knowledge across various life areas.

4. Entertainment and Leisure: There are many applications offering entertainment content suitable for each family member (Abrahimi & Kharbeesh, 2024, pp. 430-431).

Technology and artificial intelligence play an important role in forming connections within society's social fabric. However, they can also destabilise or obscure relational ties. Due to the widespread use of technology at home, family members are no longer often seen gathering around the table to converse (Zineb, 2014, p. 237).

While technology and AI applications can have a positive impact on an individual's social life, they can also have negative effects, such as exacerbating digital addiction and social isolation. This is one of the most dangerous negative effects of technology, as individuals construct boundaries around their surroundings, distancing themselves from real communities. Digital interactions are reshaping

social relationships, with true social interaction primarily occurring through technological mediation as tools for content production and transmission (Ahmed, 2018, p. 58).

Moreover, addiction to AI applications significantly contributes to depression, behavioural issues, eating disorders and communication problems. These technologies threaten the privacy of individuals and families, transforming homes into monitored public spaces where genuine human connections weaken and are replaced by superficial digital ties.

8.4 The Impact of Artificial Intelligence on Education

The educational sector is undergoing a radical transformation, with traditional teachers being supplemented or replaced by applications known as ‘smart teachers’. These tools create learning environments that are tailored to the individual needs, levels and availability of learners, while also enhancing the effectiveness of educators.

AI offers many advantages, such as providing access to essential content and teaching skills, and improving academic performance while reducing disparities in achievement. However, despite these benefits, AI applications can diminish the human role in education, stripping the process of its social and human dimensions. There is a risk that education will become a mere digital product governed by technology rather than a relational experience between teacher and learner.

Additionally, these technologies have contributed to an increase in school dropout rates, as well as issues such as attention deficit disorder and learning difficulties.

The Impact of Artificial Intelligence on Health

Advancements in AI have enabled doctors to manage vast amounts of health data, including rapid genome tracking and detailed information collection. This has made medical precision a reality, with robotic surgeries and disease monitoring becoming commonplace. AI has even outperformed human doctors in diagnosing certain conditions, such as heart diseases, with an accuracy rate of over 80%. It can also detect potential cancer growths in very advanced stages with 94% accuracy. Such rapid diagnoses can significantly improve survival rates (Shaqar, 2024, pp. 59–60).

However, an over-reliance on AI can have negative consequences, such as the marginalisation of human practitioners in the healthcare field. The role of the physician is diminished in the presence of machines.

AI’s unprecedented capabilities pose real challenges to social structures and concepts such as identity, citizenship, and humanity itself. The loss of control over AI and the inability to legally regulate it threatens the existential and ethical meaning of humanity. This progression in AI also jeopardises individual, familial and societal privacy, exemplifying the idea that the world has become a ‘small village’, where personal lives are transparent and predictable, thus undermining human values and standards.

In light of these trends in the digital future, it is crucial to raise awareness of the need to control AI and direct technology in our social lives, establishing conditions that limit its dominance.

9. Conclusion:

The rapid evolution of artificial intelligence systems and applications suggests that a new phase in the relationship between humans and technology is imminent. These technological mediums have transcended their roles as silent tools under human control and have become active, symbolic entities that influence daily life, interactions and ethical and professional behaviours by asserting their presence within the social fabric.

Sociological approaches reveal that these intelligent systems have symbolic significance and latent power, which could transform how we perceive concepts such as identity, citizenship, role, status and privacy. These social representations have undergone transformations that extend to educational, social and familial structures, becoming an integral part of human life. This integration encompasses cognitive, knowledge-based, behavioural, and even psychological dimensions.

Future challenges require social responsibility for digital dominance and an understanding of artificial intelligence as a social phenomenon, not merely a technology.

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