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## From AI Adoption to Human-AI Negotiation: Reimagining Human Agency

Priyadharshini K <sup>1\*</sup>, Shantichitra K <sup>2</sup>

<sup>1</sup> Ph.D. Research Scholar (Full-Time), Department of English, FLABS, SRM Institute of Science and Technology, Kattankulathur; priyakarah1922@gmail.com

<sup>2</sup> Professor, Department of English, FLABS, SRM Institute of Science and Technology, Kattankulathur; shanthik@srmist.edu.in

\* Correspondence: priyakarah1922@gmail.com

### ABSTRACT

*While the adoption of AI is growing in a variety of domains, including education, healthcare, governance, and creative industries and the workplace, most of the research to date frames this phenomenon through the lens of technological adoption and views individuals primarily as users of technology. The large body of work on technology adoption typically classifies individuals as adopters or resisters of technology in a simplistic fashion. However, viewing human–AI interactions through the prism of technological adoption fails to capture the complexity of human behavior in such interactions. It oversimplifies the experiences of individuals using AI. Rather than seeing individuals primarily as users of technology, it is more productive to see individuals as negotiators of AI and how they negotiate, shape, reinterpret, regulate and contest AI technologies within the social, ethical, cultural and institutional structures in which they live. This article draws on a wide range of literature, including Science and Technology Studies, critical AI studies, the digital humanities, the philosophy of technology, and sociological theories of agency, to develop the Human-AI Negotiation Framework (HANF). Through this framework, it explains how negotiation functions as an ongoing process between the technological capabilities of AI and the human values of accountability, creativity, and participation in a democratic society. The study concludes that AI futures are not predetermined by technology and are not in the hands of an individual's rate of adoption. Instead, AI futures are negotiated through ongoing iterations of human agency, institutional structures of governance and the algorithmic systems that are increasingly mediating human interactions. This article thus moves beyond the limits of current perspectives on technology acceptance and resistance to offer a novel and innovative conceptual framework for thinking about responsible AI, human agency and the coconstruction of emerging sociotechnical futures.*

**Keywords:** Artificial Intelligence; Critical AI Studies; Human Agency; Human-AI Negotiation; Human-Centered AI; Responsible AI; Technological adoption.

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## INTRODUCTION

As a specialty within computer science, artificial intelligence is becoming an increasingly fully fledged, transformative, highly influential, dynamic, and highly distributed sociotechnical force. It is in the process of completely transforming how people live, work, learn, interact, create and make decisions in almost every domain, industry, sector, profession, function, task, process and activity.

Like all technologies, AI increases human productivity, but earlier technologies automating mundane tasks increase the range of tasks that humans can perform. Most AI systems today can participate in or even take over a wide range of so-called cognitive tasks that humans have traditionally performed for themselves, such as reasoning, content generation, pattern recognition, translation and decision support (Floridi, 2014; Russell & Norvig, 2021). The enormous and interdisciplinary field of research focusing on the ethical, political, social, and economic implications of AI has grown enormously over the past few years. Here, a wide array of issues, such as AI bias, surveillance by states and corporations, AI-induced job displacement, the risk of misinformation, privacy breaches, AI and intellectual property rights, and, finally, the issue of holding AI accountable and responsible for AI development in general, are discussed (Crawford, 2021; Noble, 2018; Zuboff, 2019). On the other hand, many governments, companies, and educational institutions are actively pushing the use of AI, since they expect it to enhance their competitiveness in a globalizing market, to support digital transformation, and to foster sustainable development.

Classic models, such as the Technology Acceptance Model (TAM) (Davis, 1989) and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003), explain users' behavior on the basis of perceived usefulness and ease of use. Later models, such as diffusion of innovations theory (Rogers, 2003) and innovation resistance theory (Ram & Sheth, 1989), add more variables that explain users' behavior in more detail. The growing complexity of many societies, which are increasingly mediated by technology, in turn leads to new questions with respect to perspectives that primarily view the adoption of technologies. While individuals and groups in their lives in the world of AI-mediated interactions on an ongoing basis with technology do not remain in a position of passivity, they constantly interpret their use of technology and negotiate their use of technology in a variety of ways. In other words, technology is contested and used in new ways by individuals and groups on an ongoing basis to negotiate their place in society and their social relationships with other individuals and groups.

In addition to studying the adoption of technologies by potential users, analyzing the concept of the "user" of technologies is critical. The term "user" in the majority of technology studies thus far is related to human beings who, after a technology has been designed and implemented by others, use it. However, the interaction of technology and human users is a continuous process, not only for designers and implementers of a technology but also for users of the technology. All these actors influence the design of a technology as well as its application and its governance in a continuous feedback process. Work carried out within the field of science and technology studies (STS) has, however, much to offer in regard to

understanding the nature of the technological developments that are currently taking place. In the STS literature, a great deal of attention has been given to mapping out the complex networks of institutions, interests, values and practices that, together, influence the development of scientific knowledge and technology (Jasanoff 2004; Latour 2005). Additionally, within the field of STS, a great deal of work has been carried out that offers up a number of different conceptual tools that can be used to subject ‘technology’ to critical analysis. Importantly, from the perspective of STS, technology is not ‘out there’ as some form of autonomous entity that, in turn, has an impact on the social world. Rather, technology and the social world are coproduced (Radder 2010). In the case of AI, therefore, it is the intersection of economic interests and of the institutional structures of governance that exist to try to govern the development and deployment of AI, of a range of cultural values and social assumptions, which all need to be taken into account when attempting to make sense of the nature and development of the technology. Critical AI scholars have recently highlighted the way in which AI systems are in turn influenced by assumptions, priorities and, importantly, the power of the individuals and groups of individuals who design and deploy the technology (Benjamin, 2019; Crawford, 2021).

Recent generative AI systems are intended for release between 2024 and 2026, and users are intended to engage with the AI system’s generated results through processes such as prompting, verifying, interpreting, modifying, overseeing, and even making decisions with the AI system, both individually and in collaboration with others. During these processes, users may accept a system while questioning specific outputs, modify recommendations made by the system, place bounds on the ways in which it can be used, and even make all the institutional decisions about a technology’s adoption and implementation. Thus, in contrast to treating the newest technologies as fixed objects to be explained through a single behavioral decision, the constantly changing AI systems and their environments interact with the users’ agency, grow in capabilities, are embedded in various institutional structures, and express a wide variety of social values. Therefore, distinguishing between a technology’s adoption and its use becomes increasingly important. To a large extent, technology adoption models explain the intentions of users to adopt technologies. However, the explanatory power of these models decreases significantly for artificial intelligence. Unlike other digital technologies, AI systems are adaptive, data driven and change in their interaction with users, institutions and environments.

However, to date, most of the research on AI has concentrated on issues of ethical AI—governance, algorithmic bias, explainability of decisions made by AI systems, issues of human trust in decisions made by AI systems, and the accountability and responsible innovation of AI (Bender et al., 2021; European Commission, 2024; Floridi & Cowls, 2019). However, individuals and groups of people are currently participating in, contesting, collaborating with, adapting to and are even beginning to be governed by AI systems.

Human futures will be shaped by AI, but in all areas where human judgment, creativity, ethics and democratic participation are wanted above all else. It is the teacher who will decide how to use AI in the classroom and how to organize learning environments with the help of technology. The artist uses AI-generated content to create new works of art. Policymakers develop rules and regulations for the development of new technologies to influence their direction. Finally, citizens participate in public debates on issues of privacy, surveillance, fairness and human rights in the digital age.

Therefore, their negotiations shape not only the use of technology but also the development of many societal implications of AI systems. Their diverse practices of negotiation encompass discussions of ethical issues, technological governance, professional practices, cultural interpretations, legal interventions and citizens’ participation in public debates.

This paper draws on these insights to develop a human-AI negotiation framework (HANF). The framework enables the analysis of negotiation processes with respect to their potential to shape the future of human life with AI and of how these processes of human influence on the development of AI are determined by a multitude of factors, such as technological, institutional, value-based, regulatory and humankind. Thus, compared with technology adoption models, HANF provides a more complete understanding of human influence on the development of AI and the future of human life. The future of AI will not be determined by increasing computational power alone but rather by the quality of the processes of human–AI negotiation and their consequences for the roles that humans and AI systems will play in life.

## **RESEARCH OBJECTIVES**

The core objective of this research is to explore and examine how people interact with technology, with a particular focus on how individuals, groups, organizations and institutions can influence the evolution of technology in general and of artificial intelligence in particular. As such, this research aims to explore the term ‘negotiation’ as it relates to human interaction with technology to propose a reconceptualization of current perspectives upon human interaction with technology. Therefore, the core of this research focuses on the daily use of technology, the ethics surrounding the use of technology, and the governance and regulation of technology and its applications by institutions.

## **RESEARCH GAP**

Research on the uses of artificial intelligence (AI) in various contexts has rapidly become among the most studied technologies of the 21st century. Scholars in computer science, as well as in fields such as management, education, sociology, communication, ethics, law, and humanities, have explored many dimensions of the adoption and use of various forms of AI by individuals and organizations for the purpose of responsible innovation (Davis, 1989; Floridi & Cowls, 2019; Venkatesh et al., 2003). A large body of work exists that develops models of technology adoption that attempt to explain the variance in individuals’ and organizations’ adoption intentions for a particular technology. The majority of these models explain a significant proportion of the variance in use intentions for a number of different technologies, including various forms of AI. Indeed, many of these adoption models have become “classics” in the information systems field (Davis, 1989; Rogers, 2003; Venkatesh et al., 2003). However, there are limits to the application of these models, not least in terms of how they frame or capture the increasingly complex nature of human–technology interactions (Fuchs et al., 2019).

Human engagement with AI is currently an evolving, dynamic and ongoing process that cannot be captured by models of technology adoption, as these models depict a fixed entity that is either accepted or rejected by humans. Therefore, human engagement with AI is not a one-off decision between accepting or rejecting a new technology. Instead, it is an ongoing process of interpretation, evaluation, and modification and even of challenging how AI is regulated and used by different AI systems.

Recent research on human-centered AI, AI ethics, participatory design, and the transparency and accountability of algorithms has focused on these issues (Crawford, 2021; European Commission, 2024). In the field of science and technology studies (STS), technologies have, for a long time, been studied as being socially constructed in interactions between political, economic, cultural and scientific elements (Jasanoff, 2004; Latour, 2005). Most of this research, however, focuses on one of these aspects in isolation and does not provide a unifying conceptual framework for the study of how human agency can be effective at all stages of the AI life cycle, i.e., during the development, implementation, governance and adaptation

phases. This includes a wide variety of processes of redesign that are taking place as individuals, groups and institutions attempt to adapt to newly emerging AI systems.

As a consequence, there is a lack of adequate theoretical concepts that can describe how human agency is exercised by individuals, by institutions, by structures of governance and by technologies within a shared sociotechnical system. However, to address the previously outlined research gaps, in this paper, the processes of human-AI negotiations and their implications for the future of AI are discussed. In our conceptual analysis of the processes of human-AI negotiations, humans not only accept or reject a technology but also continuously interpret, evaluate, modify, and even negotiate with a technology to fulfill their goals.

Human-centered AI, the sociotechnical approach to technology and participatory governance of technologies contribute to a better understanding of how humans are involved in developing AI. However, these perspectives on their own do not offer the specific analytical structure of HANF. The human-centered approach to AI focuses on ensuring that human needs and values are addressed when AI systems are designed and used. The sociotechnical approach highlights the reciprocal relationship between a technological system and the social structures that surround it. The participatory governance of technologies refers to all stakeholders involved in decisions concerning a technology as well as the rules that are set up to govern its use. By focusing on the concept of negotiation in HANF, these different perspectives on human involvement in the development of AI are combined. Human agency is negotiated in various ways throughout the AI lifecycle, and HANF offers a specific conceptual framework to analyze the ways in which human agency is sustained as AI systems evolve. Therefore, HANF is not an alternative to existing perspectives on human involvement in the development of AI; rather, it is a complementary way of thinking.

While research into the adoption by international students of generative AI as well as the related academic-integrity implications is slowly emerging, there are many gaps that need to be addressed. Not least, a framework is needed that connects international students' experiences of different contexts (i.e. academic, institutional and cultural, etc.) through the lens of their agency. This is what HANF does by recognizing that, within the complex contexts of international higher education, students are not simply recipients or adopters of new technologies, but participants interpreting, negotiating and influencing their uses.

To conceptualize these types of Negotiations in this paper, we introduce the Human-AI Negotiation Framework (HANF). This proposed framework outlines how the futures of AI are negotiated by reciprocal interactions of human agents and technological capabilities and by the institutions in which these interactions take place. It integrates insights from a variety of disciplines, including critical AI studies, digital humanities, the philosophy of technology and many other fields of sociology. With the HANF, a human-centered framework for the study of AI is introduced to research AI. Consequently, our perspective on the implications of AI for human futures is fundamentally different from most current adoption-centered frameworks.

## **LITERATURE REVIEW**

### **Artificial Intelligence Adoption Models: Contributions and Limitations**

The rapid spread of AI has recently been the focus of an ever-increasing number of studies that explore the factors that determine the adoption of new technologies by individuals and organizations. Studies of technology adoption have a long tradition, dating back to studies of how people come to terms with and use new technologies. Most influential models of technology adoption are rooted in these studies.

The Technology Acceptance Model (TAM) (Davis, 1989), the Diffusion of Innovations Theory (Rogers, 2003), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) are some of the most widely used models of technology adoption. These models have been applied in a variety of contexts and domains, including education, healthcare, business, public administration and information systems. The technology acceptance model (TAM) has been extended and applied in numerous studies to explain the acceptance of individuals by AI systems. A variety of decision support systems, educational technology, conversational agents and other applications of generative AI have been investigated using the TAM. The core of the TAM is based on two beliefs of potential users that determine the user's intention to use a system: perceived usefulness and perceived ease of use. To better explain the acceptance of increasingly complex technologies of AI, several versions of the TAM have been proposed. These extended versions of the TAM take into account additional variables, such as users' trust, perceived risk, social influence and users' and organizations' facilitating conditions.

Diffusion of Innovations Theory views technology adoption as a process through which innovations are spread through social networks. An important aspect of this process is the set of characteristics that an innovation can have, some of which are more important than others for the rate of diffusion. The five key dimensions that are used to assess innovation are (1) relative advantage, (2) compatibility, (3) complexity, (4) trialability and (5) observability. These characteristics are important for technology adoption at the organisational level as well as for digital transformation processes in various industries.

The unified theory of acceptance and use of technology (UTAUT) is a more comprehensive behavioral model that explains users' behavioral intention and usage behavior of information technology by four key antecedent variables, i.e., performance expectancy, effort expectancy, social influence and user behavior intention. These four variables are in turn influenced by several antecedent variables. For this reason, UTAUT is more appropriate than the other models for explaining users' acceptance and usage behavior of a wide variety of information and communication technologies. In recent years, UTAUT variables have been used to predict the behavior of users facing new and complex technologies, such as generative AI systems, intelligent tutoring systems and healthcare algorithms.

**Table 1**  
*Comparative overview of technology adoption models and HANF*

| <b>Dimension</b>      | <b>TAM</b>                           | <b>DOI</b>                                   | <b>UTAUT</b>                          | <b>HANF</b>                             |
|-----------------------|--------------------------------------|----------------------------------------------|---------------------------------------|-----------------------------------------|
| Primary concern       | Technology acceptance                | Diffusion of innovation                      | Technology acceptance and use         | Human – AI negotiation                  |
| Main analytical focus | Perceived usefulness and ease of use | Characteristics and diffusion of innovations | Behavioral intention and use          | Continuous exercise of human agency     |
| Human role/assistance | User/Individual to accept            | Adopter within a social system               | User influenced by contextual factors | Negotiator, interpreter, contributor    |
| Engagement            | Primarily adoptive                   | Diffusion and Adoption process               | Usage intention and behavior          | Ongoing interaction across the AI cycle |

|                                  |                                         |                            |         |                                 |                                                                      |
|----------------------------------|-----------------------------------------|----------------------------|---------|---------------------------------|----------------------------------------------------------------------|
| Adaptability                     | Relatively stable technology assumption | Innovation diffusion time  | over    | Contextual technological change | AI as evolving and adaptive sociotechnical system                    |
| Decision-making                  | Acceptance intention                    | Adoption diffusion         | and     | Behavioral use and intention    | Interpretation, evaluation, regulation, modification and co-creation |
| Core contribution to AI research | Explains acceptance                     | Explains diffusion         |         | Explains user behavior          | Explains continuing human agency and negotiation                     |
| Temporal focus                   | Primarily before or after adoption      | Diffusion time             | over    | Intention and use               | Continuous throughout the AI cycle                                   |
| Stakeholder involvement          | Primarily user focused                  | Social and network context | adopter | Individual and organisational   | Individuals, Professionals, institutions, etc.                       |

Despite their contributions to the studies of technological development and use, the models of technology adoption have crucial limitations when they are applied to the studies of AI. For instance, the models of technology adoption describe technology use as a preimplementation or implementation decision made by individual users before they start to use the technology. However, AI is a continuously learning technology, and it is under development at any time. The technology is frequently updated, and in some cases, there are changes to the rules and regulations that are designed to govern its use. As a result, the way in which humans engage with the technology extends beyond the point at which they first decide to adopt the technology. Users are required to reassess the outputs of the technology on an ongoing basis. They modify their use of the technology occasionally. They negotiate around a number of the ethical issues that arise from the use of the technology. They modify their professional practice to make best use of the technology.

Moreover, most technology adoption studies focus on the users of a technology. This user can accept a technology, reject it, or even continue using a technology that has already been accepted. In most studies on technology adoption, several moments at which the user of a technology makes a decision are studied. These moments are often determined by public parties.

In recent years, the simple term “adoption” has become too narrow for the processes occurring with the implementation of AI. New aspects must be taken into account for the responsible use of AI, such as transparency and explainability, fairness, accountability and human oversight. The international discussion of the regulation of AI is currently taking place between governments, industries, research, civil society, and the European Union’s AI Act, which is one of the first comprehensive attempts at a regulatory framework for AI. For this reason, the term adoption is no longer sufficient to describe the

complex processes of the interpretation, governance, and development of new technologies in a social context. Technology adoption models are unable to explain the evolving, multidirectional and socially embedded human interactions with technologies in AI-mediated societies. What is needed is a framework that explains the degree and ways in which human agency continues to operate throughout the technology life cycle after the initial adoption decision has taken place.

## **Human Agency in Technology Studies**

The core concept of human agency in technology studies, as offered by the social sciences in general, is the way in which individuals make sense of a technology and put it to use. Therefore, in essence, the use of a technology is influenced by the technology itself as well as by other structures and institutions where the technology is a part of it. The key work in this field of study is that of the British sociologist Anthony Giddens. In his book *Structuration Theory* (Giddens, 1984), he discussed human action and its influence on the social world that it is part of. He concluded that human action in fact structures the social world in which it takes place and at the same time is influenced by the very same social world. This also holds true for studies on human–AI relationships.

In the case of AI technologies, humans do not just use them; they also determine the purposes to which these technologies can be put and even their limitations. In this sense, the way in which humans make sense of a particular AI technology and put it to use influences not only the way in which that technology is used but also the way in which that technology will develop over time.

Most of these, however, have focused on the design and implementation of a particular technology and the array of social actors and institutions that influence these processes. Less attention has been given to how, after a technology has been implemented, it is modified by a variety of social practices. In contrast, earlier models of technology, such as technological determinism, took the view that technology is outside of human control. For instance, technological determinism could be seen as viewing the development of technology as following several stages whereby technology would progress through a number of developmental stages regardless of human intervention (Winner, 1986). However, as technology and structures become more complex, the role of technology in society becomes increasingly intertwined with the social structures in which it is embedded, thus increasing the role of human agency within that technology.

An increasingly nuanced understanding of how humans exercise agency with respect to technology exists today. Most models of technology adoption focus upon the individual user and their behavioral acceptance of the technology. There are, however, many studies that reveal the complex ways in which other forms of human agency play out in relation to technology, for example, professional judgment, ethical deliberation and technology governance at the institutional level. (

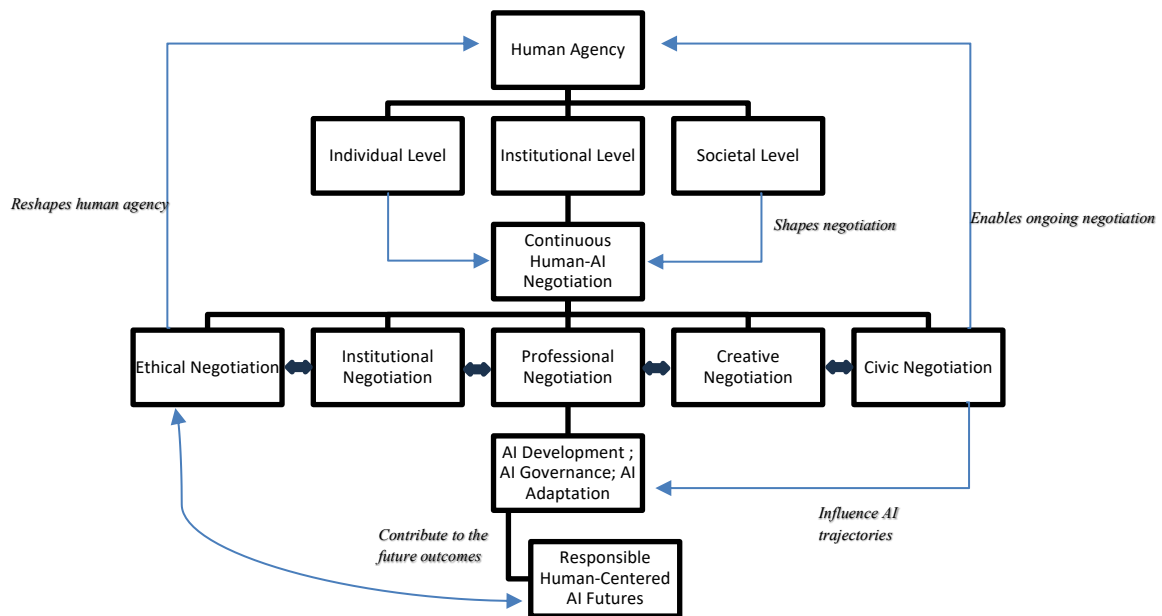
This perspective affords a dynamic and reciprocal understanding of the human relationship to technology within the social framework. Thus, how we negotiate and shape technology to achieve our goals is always active in a variety of ways, as part of our human practices, while we are also limited by technology. The technology within which we operate, in turn, shapes the terms within which we can negotiate to utilize it for our purposes. Hence, our ‘use’ of technology is not a simple matter of being passive users of a technological system. Rather, the process of our negotiation of technology to utilize it is an ongoing, constantly changing process within the set of terms provided by the technology itself as well as within the social structure in which it is embedded. The perspective presented here thus affords the necessary foundations for the establishment of a framework for understanding human–AI negotiation, drawing on science and technology studies (STS) as well as critical studies of AI.

## THEORETICAL FRAMEWORK

The Human - AI Negotiation Framework (HANF): A Framework for Understanding Human Agency in the Human - AI Negotiation Process. There are existing technology adoption models (e.g., [Davis, 1989; Venkatesh et al., 2003]) that explain the factors that influence an individual's decision to adopt or reject technological innovation. These models are still very much relevant for explaining an individual's behavioral intention, yet they provide little insight into how humans continuously shape AI systems after adoption. This article provides an outline of the human-AI negotiation framework (HANF), which facilitates an in-depth analysis of the various forms of human agency that exist throughout the AI lifecycle.

**Figure 1**

*Human-AI Negotiation Framework*



*Note.* The five dimensions of HANF should not be understood as a series of isolated and sequential steps for the management of AI. Instead, the different dimensions form a web of negotiation through which human agency can intervene at various points within the process of development and application of AI. Through the process of ethical negotiation, a basis is created for values to be negotiated, responsibility to be allocated, fairness to be promoted, and certain uses of AI to be considered more acceptable than others. These values are then translated into structures for the management of AI within a particular context through the process of institutional negotiation. These structures are in turn managed by professionals in their work and practice and as experts in various fields through the process of professional negotiation. Creative practices are transformed through the application of AI in various ways through the process of creative negotiation. Finally, the impact of the development and application of AI on public life and the types of interventions that are required within public life to manage these impacts are investigated through the process of civic negotiation.

## METHODOLOGY

This study is qualitative conceptual research. It explores human agency in the processes of AI adoption and conceptualizes future developments of AI by means of the Human-AI Negotiation Framework (HANF). In contrast to empirical research, which is often based on survey, interview or experimental data and thus relies on available data. In conceptual research, available data are critically analyzed and synthesized in the process of writing. The goal of conceptual research is to develop new perspectives and to foster theory (Jaakkola, 2020). In this study, the relationship between humans and AI is conceptualized, not the process of technology adoption by humans.

The study analyzed in this article is largely based on the existing interdisciplinary literature on science and technology studies (STS) and, more recently, critical studies of AI. This study refers to a large volume of existing research, including in other disciplines, such as sociology, philosophy of technology, digital humanities and AI governance, to incorporate foundational theories on technology adoption, such as the Technology Acceptance Model (Davis, 1989), diffusion of innovations theory (Rogers, 2003), and the unified theory of acceptance and use of technology (Venkatesh et al., 2003). Key concepts from the field of sociology are also analyzed, including structuration theory (Giddens, 1984) and coproduction in STS (Jasanoff, 2004). In addition to these foundational theories and concepts from the study of technology adoption, the article also draws upon more recent areas of literature concerning responsible AI, AI governance, explainability and human-centered approaches to AI. Much of the literature that has been analyzed for this study was written in part or in full for its relevance to human agency and AI adoption, as well as to the broader field of technology adoption.

The studies that were analyzed for this article were selected on the basis of three criteria: (1) relevance to human agency and AI; (2) relevance to technology adoption as well as technology's governance and impact on societies and organizations in terms of existing theories as well as in terms of more recent work in disciplines; and (3) the fact that the selected studies have been published in scholarly peer-reviewed journals, books and policy documents and other governance frameworks and therefore are considered to be both academically significant and highly relevant to the current studies of technology's impact on human agency and AI adoption. The literature selected for the study is based on three criteria. First, the literature needs to address the topic of human agency and AI. Second, the literature also needs to address technology adoption, governance or, in a broader sense, the sociotechnical system. Finally, the selected literature is also scholarly in nature. This means that it has been published in refereed journals and books as well as more applied policy and practice-oriented work. After a relevant body of literature was identified, it was analyzed from a thematic perspective to identify the main themes as well as points of convergence and conflict, not only between different theoretical approaches but also within individual approaches. The literature was not organized in a chronological fashion; rather, the main areas of agreement and conflict were identified.

Conceptual studies, even though they are not generalizable in the same way as empirical studies are, can provide more in-depth insights into a topic, reveal gaps in current research and even enable the development of new concepts and analyses to be applied in later empirical studies (Jaakkola, 2020). Thus, the results of this study can be used to develop the Human-AI Negotiation Framework, a theoretically developed model for future validation in a variety of AI contexts rather than a verified theory in itself.

## ANALYSIS AND DISCUSSION

### **Beyond Technology Adoption: Repositioning Human Agency through Negotiation**

While traditional technology adoption theories have helped explain why individuals and groups accept and use certain technologies, the current and future technologies of artificial intelligence require a more sophisticated understanding of the human role in the adoption and use of technology. Current theories of technology adoption were developed before the widespread adoption of the internet and current digital technologies. The increasing number of human–AI interactions in digital systems raises new challenges for research on the technology adoption of intelligent systems. Like in the case of earlier digital technologies, the Technology Acceptance Model (TAM), the Diffusion of Innovations Theory (Rogers, 2003), and the Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et al., 2003) explain why and how humans adopt and use technologies. Importantly, however, these models describe a singular event, i.e., a human decision that corresponds to the implementation and subsequent use of a stable piece of technology. As already mentioned for the diffusion of innovations theory, intelligent systems today are no longer fixed entities; rather, they can change continuously over time. Software updates, models, rules, and even laws are subject to change and thus influence possible human–AI interactions. While it might seem sufficient to explain the acceptance of such a technology in the same way as for earlier digital technologies, the process, however, appears to be more complex.

Moreover, new generations of digital technologies, particularly AI systems, are continuously evolving. They go through a cycle of software updates and model improvement. They also receive feedback from users. In addition, there are legal and policy changes and learning by organizations. As a result, humans are involved in the process of interpretation, evaluation, and governance of such systems on an ongoing basis. Hence, humans are not merely deciding whether to use AI. Instead, they make continuous decisions on how, when, and where to use AI. The decision to use AI is influenced by the implementation context of the technology within organizations and wider society. Therefore, AI is no longer about the initial acceptance of a technology and its subsequent use. It is about human–AI interactions on an ongoing basis. Such interaction is characterized by a process of continuous negotiation between humans and AI systems. The Human–AI Negotiation Framework (HANF) - presented in this study - fundamentally changes our current understanding of the complex and dynamic relationship between humans and AI by putting negotiation at the center of it. Human–AI Negotiation is an ongoing process in which individuals, organizations, and societies interpret, manage, regulate, adapt, and modify to reach their ethical, professional, organizational, and civic objectives with the aid of AI systems.

### **Applying the Human-AI Negotiation Framework**

The Human-AI Negotiation Framework, developed in this study, is used to explain the future development of AI through the following five different types of negotiations: ethical, institutional, professional, creative and civic.

While technology can go a long way to enabling applications to be implemented that would otherwise be difficult to implement, the technology itself cannot determine whether an application is socially acceptable. Instead, the application must be fair and transparent, ensure that individuals are held accountable for their actions, protect all individuals' privacy and provide explanations for decisions made by the AI system. These are ongoing considerations that require human judgment. For example, organizations that implement generative AI must consider how to verify any content that is

generated by the technology. Educational institutions use technology to deter acts of academic dishonesty and need to develop policies to address instances where the technology fails. Similarly, healthcare providers use this technology to support clinical decision-making and need to consider the ethical implications of using the technology for this purpose.

Institutional negotiation is, in many respects, the continuation of ethical negotiation, since it is within institutions in which technologies are implemented. These institutions can be organizations such as universities or government agencies, but they can also be hospitals or companies of all types and sizes. In all of these cases, organizational policies and existing structures of governance and professional practices need to change to implement AI (Brunner & Tao, 2023). Therefore, the key factor determining the form that any AI technology will take is not the technology itself but the organisational, institutional and other social structures through which it is implemented (Bannister et al., 2024). This is particularly the case in terms of key factors such as how a technology is procured, how it is ensured to be compliant with all relevant laws, how risks are managed, and how the technology will be governed (Jasanoff, 2004; Latour, 2005).

Professional negotiation relates to how professionals use AI to carry out their work to the best of their ability and to make decisions. They use AI to make better decisions, and in doing so, the responsibility of the professional is not diminished. It is the human who makes the final decision, taking into account the data and information provided by the AI, as well as other information and expertise from other sources. In healthcare, for example, AI systems are used by doctors and nurses to support their decisions regarding patient care. These decisions are made on the basis of a patient's full medical history as well as on the basis of the doctor's or nurse's own experience and professional judgment. The decisions made by teachers regarding individual students are also based on their professional judgment as to what is best for that student, taking into account information regarding the student's academic progress as well as any additional support needs that the student may need. Other professionals, such as journalists, lawyers, engineers and scientists, similarly use AI systems to carry out their work to the best of their ability and to make the best possible decisions. In all the cases, the AI system is used as a decision-support system, and the final decision is made by the human.

Creative negotiation with AI looks at the work of the creative practitioner (writer, artist, designer, filmmaker, musician, etc.) and how they negotiate the issue of authorship, originality, due credit and fair representation within cultural parameters.

Civic negotiation extends the framework for the negotiation of AI systems and other forms of human agency. Thus, in addition to the makers and users of the technology, the structures that implement and support the users of the technology, i.e., citizens, civil society, the policymakers and public institutions of society, will also negotiate in public debates about privacy and surveillance, the fairness of algorithms, the distribution of benefits and risks, access to AI systems, and the accountability and regulation of AI systems. The future of AI systems will be shaped not only by individual technology companies, where most of the development of current AI systems is taking place but also by public deliberation and the decisions of communities and institutions.

First, traditional behavioral models of technology acceptance are not sufficient for explaining how people use technology today. Well-established models have been used to explain technology acceptance. For example, the technology acceptance model (TAM) has been used to describe how people come to accept technology. Such models are, however, limited in their ability to fully capture the complexities of human–AI interactions, as well as how technologies evolve and are used in different ways. Second, the five dimensions of the HANF (ethical, institutional, professional, creative

and civic) collectively highlight the importance of human agency in AI futures and how this continues to play a central role in determining how technology is used long after its initial acceptance. Third, the process of negotiation represented by the HANF is an ongoing and highly complex sociotechnical process that allows for the balance of technological advancement, human values and needs.

**Table 2**  
*Comparison: Technology Adoption vs. HANF*

| <b>Technology Adoption Models</b> | <b>HANF</b>                                      |
|-----------------------------------|--------------------------------------------------|
| Initial adoption decision         | Continuous negotiation                           |
| Individual user                   | Individuals, institutions, governments & society |
| Behavioral intention              | Human agency                                     |
| Technology acceptance             | Cocreation, governance & adaptation              |
| Static technology                 | Adaptive AI systems                              |

**HANF in International Higher Education**

HANF is relevant in international higher education, where students encounter AI in various settings (academic, linguistic, cultural, and institutional) and are constantly trying to meet expectations of how to complete tasks in their learning environments. Research on the use of generative AI by international students is limited. Recent work has discussed the factors that determine students’ intentions to use GenAI. These factors include students’ trust in using GenAI, AI literacy, their perception of the added value of GenAI, and their concerns about possible misuse and consequent plagiarism (Ittefaq et al., 2025). This list of factors focuses only on students’ complex interpretations and negotiations of AI use in their academic environments. HANF can be used to make sense of these students’ complex interpretations and negotiations.

For example, an international student may use generative AI to obtain language support, to explain an academic concept or even to write the initial part of a piece of academic work. Therefore, a student’s engagement with generative AI involves not only the use of new technology but also a process of negotiation between the capabilities of a generative AI system and the academic goals of a learner, their language needs and the institutional framework within which it is acceptable to use AI to support learning.

Further, students’ academic participation and feelings of belonging might also be affected when, for instance, translation and communication and learning support tools are used in class in order to support students’ participation in learning processes. In this sense, students will have to decide when to use support from AI and when to use support from teachers and classmates. The study examines how international students in Higher Education analyze, manage, adjust to and negotiate the use of AI in different contexts or spheres.

## CONCLUSION

Artificial intelligence is more than the simple adoption of new technology by individuals and organizations in different parts of the world. AI currently influences a variety of aspects of people's lives. We already have a considerable body of knowledge about AI adoption. What is lacking is an understanding of human–AI interactions at various stages of AI's lifecycle.

The vast majority of current research on technology adoption focuses on why individuals and organizations adopt particular technologies. However, little attention has been given to how individuals, groups and institutions affect a technology after it has been adopted. To analyze human agency beyond technology adoption, the Human-AI Negotiation Framework (HANF), which was introduced in this article, can be used for future research as well as for applications in various fields, such as higher education, public health, public administration, creative industries, journalism, and law. Studies in these fields can be conducted from the perspective of negotiation, thus testing the proposed framework in various contexts. First, studies can be conducted in various domains to test the framework in various contexts. Second, the five dimensions of HANF can be refined and even operationalized by introducing quantifiable indicators to explain how these dimensions interrelate with each other as well as with other variables. Third, studies can be conducted in various countries and cultures to utilize the proposed framework as a tool to compare the way in which negotiation is conducted in different parts of the world, i.e., by studying AI governance from a global perspective while taking into consideration the many differences between countries as well as within a country in terms of various technologies as well as the needs and expectations of citizens in those countries. Thus, HANF can be used not only to compare various technologies but also to compare various approaches for developing and implementing them.

This Human-AI Negotiation Framework (HANF) is used to study and analyze how negotiations regarding technology take place and has three main functions. First, in the aforementioned body of research on technology adoption, the framework proposed in this article conceptualizes negotiations in an ongoing and continuous process of human agency during the entire lifecycle of a technology. Second, the HANF represents an interdisciplinary framework that integrates, at the level of analysis—behavioral research—the social sciences as well as research on AI-governance and critical studies of technology. Third, HANF supports the perspective of human-centered AI, as the responsible development and implementation of technologies in the future will depend not only on the computational features of this technology but also on human ethical judgment, institutional accountability, civic participation and collaborative structures of governance.

When the use of AI is impacted by differences in language and culture as well as by rules of academic integrity, university policies, and many governance structures that impact the mobility of students and faculty, HANF becomes particularly relevant. For researchers and practitioners working with international students, HANF provides a framework to see these students not only as users of AI but also, most importantly, as media who continuously interpret, negotiate and react to the use of AI in various settings and within institutional and sociocultural structures. Thus, HANF can facilitate a more nuanced understanding of the complex relationships among AI, equity, cultural difference, student agency, and the responsibilities of institutions in the emerging field of AI-mediated international education.

In researching the perspective on AI for international higher education, the current state of adoption-oriented research on AI is extended and studied with respect to the conditions that influence agency with AI in various settings. Utilizing the HANF framework, this perspective supports the

existing research on how language, academic-integrity expectations, the institutional governance of learning environments, cultural differences and students feelings of belonging to a community influence the many ways that students negotiate with AI in a variety of settings.

The limitations of this study are conceptual in nature, as HANF has not yet been empirically tested. Therefore, HANF should be considered a theoretically founded model that will be tested, refined and even applied in other fields of technology as well as in other cultures in future studies by means of qualitative, quantitative or mixed-method approaches.

Decisions and practices, both within and across institutions, by professionals and by the public at large, regarding the future of AI will shape the development and use of AI systems. These negotiations form a key part of human agency in the era of AI. Understanding these negotiations is crucial for the development of human-centered AI.

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## Author Bios

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**Priyadharshini K** is a Ph.D. scholar in the Department of English, FLABS, SRM Institute of Science and Technology, Kattankulathur, India. Email: priyakarah1922@gmail.com  
ORCID: <https://orcid.org/0009-0000-8161-1185>

**Dr Shantichitra K** is a Professor in the Department of English, FLABS, SRM Institute of Science and Technology, Kattankulathur, India. Email: shanthik@srmist.edu.in  
ORCID: <https://orcid.org/0009-0008-4917-6564>

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