ASSESSMENT OF ANTECEDENTS AND INTERPERSONAL DIFFERENCES IN TECHNO-ETHICAL ORIENTATION IN INDIA

A thesis submitted in fulfillment of requirement for the award of

Doctor of Philosophy
in
University School of Management and Entrepreneurship
by

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2K18/PHDUSME/501

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DECLARATION

I hereby declare that all the work presented in the thesis entitled **"Assessment of Antecedents and Interpersonal differences in Techno-ethical orientation in India "** in fulfillment of the requirement for the award of the degree of Doctor of Philosophy in University School of Management and Entrepreneurship, Delhi Technological University, Delhi is an authentic record of my own work carried out under the guidance of **Dr. Naval Garg,** Assistant Professor, University School of Management and Entrepreneurship, Delhi Technological University, Delhi.

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Place: Delhi
Date: 06.01.2023

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This is to certify that the work embodied in the thesis entitled **"Assessment of Antecedents and Interpersonal differences in Techno-ethical orientation in India"** is done by **Ms. Shivangi Verma** as a full-time scholar in University School of Management and Entrepreneurship, Delhi Technological University is the authentic work carried out by her under my supervision.

This work is based on original research, and the matter embodied in this progress report has not been submitted earlier for the award of any degree or diploma to the best of my knowledge and belief.

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Published Papers

- Research paper titled **"Being ethically resilient during COVID-19: A cross-sectional study of Indian supply chain companies"** authored by Shivangi Verma, Dr. Naval Garg and Dr. Thangaraja Arumugam published at International Journal of Logistics Management, Emerald (SSCI IF- 5.44)
- Research paper titled **"Exploring Inter-generational differences in technology-oriented ethical behaviour"** authored by Shivangi Verma and Dr. Naval Garg published at Kybernetes, Emerald with ISSN: 0368-492X (SCI IF- 2.35)

Paper under Review

- Research paper titled **"Development and validation of techno-ethical orientation scale for Indian post-millennial students"** under review at SSCI and ABDC indexed journal.
- Research paper titled **"The trend and future of techno-ethics: A bibliometric analysis of three decades"** under review at SSCI and ABDC indexed journal
- Research paper titled **"Exploring the psychometric properties of the digital citizenship scale among Indian students"** under review at SSCI and ABDC indexed journal

Chapter published

- A chapter titled **"The Realm of Ethics Research"** authored by Shivangi Verma and Naval Garg published in a book titled "Innovative Corporate Practices Issues and Challenges" by EDU Boulevard Private Limited with ISBN: 978-81-8412-241-1

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CHAPTER 1: INTRODUCTION

Introduction to the Problem

The rise of the internet and technology has revolutionised the human existence. The communication, dissemination, functioning, and survival of humans and organisations are possible because of technological advancement and early adoption. At the onset of the COVID-19 pandemic, the world progressively moved towards technology usage as a medium to combat lockdown, isolation, inaccessibility, and work-related restrictions (Kasar & Karaman, 2021; L. Lin & Hou, 2020; A. Sharma et al., 2020; Vargo et al., 2021; Waheed & Shafi, 2020). In India, around 742.0 million people started using the internet (Digital 2022: India). India alone ranked second in the world with 658.0 million active internet users in January 2022. It highlights an increase of almost 5.4 per cent (i.e., 34 million) of internet users between 2021 and 2022. These figures portray a towering penetration of technology and the internet in every walk of our life.

The current status reveals that technology has become a part of human civilisation, and with the imperative use and adoption of technologies, world is approaching technology civilisation. Nowadays, technology is even more than our world and our civilisation. In the words of Don Ihde (1979), “our existence is *technically textured*." Researchers have argued that the world resides in a *technosphere* with a *technologically mediated self* of *techno sapiens* (Davis-Floyd & Chalmers, 2021; Gergen, 2017; Goodman & Collins, 2019; Ihde, 1979b, 2020; Puech, 2018). Unlike science, technology interacts with the world to change it. Technology has influenced and modified various nodes and sections of society to find their place in the world. Technologies have not only adjusted or influenced the existing norms and systems but have also introduced new dimensions of values and decision-making.

With the growing involvement of technology in our daily practices, there are significant uncertainties surrounding the ethical use of technology (Fjeld et al., 2020; Grosz et al., 2019). There are growing concerns among researchers, practitioners, and policy makers regarding rampant unethical use of modern technologies. These unethical practices are not only psychological demoralizing, but they also lead to economic disadvantage to business organisation and society at large. The knowledge about technology is abstract, boundaryless, and never-ending (Green, 2021). This adds to the complexity of defining technology's ethical or unethical use, and every new technology brings a new set of guidelines. Moreover, just like humans are governed and regulated by a set of societal ethics and norms; likewise, technologies are influenced and guided by the ethics of their users. Due to this, the quest to code ethics into

the technologies is a requisite (Green, 2021). It is surprising to note that several ethical assessment tools and frameworks, such as Define, Issues, Options, Decision and Explanation (DIODE), Framework for Responsible Research and Innovation in ICT (FRRIICT), and Software Development Impact Statement (SoDIS), are available to evaluate the ethical conduct of new and emerging technologies. These tools help researchers, engineers, and information technology (IT) designers to identify probable risks and irresponsible issues that may arise while using technologies (Harris et al., 2011; Rogerson, 2017). But from the perspective of technology users, there exists 'silo thinking' among practitioners and research communities, which prevents optimum and righteous use of technology. This initiates the need to apply ethics in technology to address the cause of unethical practices by individuals that costs a huge loss to organisations, national and international bodies.

The integration of ethics and technology is evoking the interest of a broader population beyond developers, ethicists, and philosophers. Researchers and practitioners submit the need to inspect: how technology and ethics interact, how ethical principles regulate technology, and what could be the probable future course of action to execute techno-ethical practices in a socio-technical discourse effectively. Apparently, technology has given rebirth to a viable discipline of ethics called *'technoethics.'* Technoethics, an interdisciplinary field that deals with the interaction of ethical framework and technology aspects for the betterment of society, sets forth the emergence of integrating ethics into technology.

Background

India being a developing nation, is gearing too fast in almost every field. With a population of about 136 crores till the first quarter of 2022, India stood second in the list of countries with the highest number of internet users. The number of internet users in India has increased by almost 13,060% over the last two decades (Internet World Stats, 2022). Moreover, during COVID-19 pandemic, around 742.0 million people in India started using internet (Digital 2022: India). This incredibly fast evolution and penetration of the Internet in every sphere of life has made technology an inescapable reality. No research and activity remain unaffected by the Internet or technology.

With the increased use of information and communication technology (ICT) at the workplace, the organisation receive considerable benefits in terms of productivity, low operating costs, improving product quality, generating new business development opportunities, flexibility, timely solutions, and increased communication (Parungao 2020; Reynolds, 2020; Sharma, 2020). The continued technological investment by the organisation

for their businesses has brought about higher productivity, better services, and maximum reach (Abdullahi et al., 2019; Akhavan et al., 2021; Dastane, 2020; Mahmood & Mann, 2005). However, despite the innumerable benefits offered by technology, organisations are facing a complex challenge to make optimum and ethical utilisation of technology (Lobschat et al., 2021; Munoko et al., 2020; Prathomwong & Singsuriya, 2022; Regan & Jesse, 2019; Wangmo et al., 2019). In reaping the benefits of technology, the un-technoethical practices appear as a by-product.

Although digitalisation in companies has led to revolutionary improvements in the design and manufacturing processes, operations, and services, it has also increased ethical complexities (Tjahjono et al., 2017). Some of the technology-related ethical issues experienced by organisations during the recent global health pandemic were a cyber security risk, data tracking, data stealing, internet spammers perpetrating attacks, inadequate bandwidth of the unencrypted and unregulated channel, unpatched software, obsolete operating systems, inability to ensure safety and confidentiality of sensitive data (Verma and Garg, 2022; Parungao 2020). Employees and organisations working in the virtual environment and connected via technology have reported unethical usage of modern technologies and ICT devices (Carroll & Conboy, 2020; Verma & Garg, 2022). Moreover, owing to the widespread adverse effects of coronavirus and the mandatory adoption of technology for communication, the unethical business practices during the COVID-19 period have been exacerbated. Given the pervasive and inevitable use of technology, researchers have started to develop antecedents, forms, and aftermath of unethical use.

As the whole world is confined in their homes, technology has become a new site for reorientation and reimagining of different modes of engagement. Moving online and adopting new methodologies or mode of interaction has pushed the boundaries of technology and its applications to a new venue. This new venue, which is unexplored and has the potential to turn the world into a full-fledged wired society, requires new guidelines and norms to operate. The specificity and complexities of technology call for shifting the focus related to ethical issues from data-driven to a more human-centered approach. Therefore, the unparalleled growth and development in both scope and size of the technology require the development of revised ethical protocols. The emergence of new technology creates challenges regarding the application of ethical standards. Far fewer studies have taken a micro approach to ethical issues associated with technology usage, that is, how an individual interacts with technology as an end-user, whether in an ethical or unethical way. A plethora of studies since last three to four decades have focused on defining the ethics; understanding the difference between ethics and

moral aspects; reach of business ethics and their impact on business, employees and all around the culture but research on the peculiarity of ethical decision-making from a technological perspective is still in its early stages. Most of the extant studies have mainly focused on the identification of factors associated with unethical or ethical behavior; why individuals indulge in unethical practices and psychological or social consequences of such actions. Furthermore, previous studies have validated the well-established scales to measure ethical orientation on various samples, cultures, or organisations.

The stream of research in ethics is not limited to public policy, law, or sociology; it is increasingly gaining attention in businesses for policy making, in understanding technology milieu and for individual development as well. Meanwhile, the technology developed and expanded to numerous domains; therefore, techno-ethics or ethics of technology were introduced. Ethics defines a thin line between wrong and right; therefore, the decision of management regarding policies should be studied in light of moral and ethical aspects. Since organisations and individuals are part of the technologically equipped milieu, therefore, the interaction of ethics and technology is indispensable. Up to date, fewer studies have attempted to examine the field of techno-ethics, which was first coined by Bunge (1977). Techno-ethics has gained substantial attention by scholars to understand the new approach to ethics due to the increased proliferation of Information Technology (IT); however, examining the techno-ethical orientation and technology acceptance by individuals specifically in India suffers lack of research and understanding. It is noteworthy that maintaining an ethical environment in the organisation inspires employees to conduct business ethically. In turn, organisation experience benefits in terms of motivated employees, positive work culture, and enhanced commitment (Afridi et al., 2020; Kaur & Kaur, n.d.; Sami et al., 2016; D. Sharma, 2018; Valentine, Godkin, Fleischman, & Kidwell, 2011; Valentine, Godkin, Fleischman, Kidwell, et al., 2011). In all, nurturing an ethical environment fostered with corporate ethical values is essential for the organisation's long-term sustainability (Choi et al., 2017a; Koronios et al., 2019). Along with human resources, technology being a resource should be utilised ethically to experience beneficial outcomes that would equip the organisation with productivity, business agility, and effective customer interaction.

The contribution of the present study constitutes five objectives, particularly. The first objective focuses on the understanding the phenomenon of techno-ethics and what antecedents shape a techno-ethical orientation of an individual. Subsequently, the study focuses on development of a scale to measure the techno-ethical orientation of individuals in India. The third objective studies the contribution to the field of techno-ethics by investigating the

difference in technology oriented ethical behavior among different generations in India. The fourth objective explores the facets of techno-ethics and ethical decision-making at industry and organisation level. Lastly, this study looks at interrelationship between techno-ethical orientation on corporate ethical values. In all, the study analyses the concept of 'techno-ethics' at individual, generational/group and organisational level.

Problem Statement

It appears that a new movement is afoot to integrate technological experiences in the ethical decision-making process and corporate ethical values. This study aims to contribute to the previous findings, inspiring new questions, and added research. Considering the widespread misuse of resources and technology at various levels, studying techno-ethics at individual, group and organisational level is paramount. Larger unethical practices and scandals may lead to even more catastrophic consequences for the firms when the use of technology is indispensable for business operations. The impact of unethical conduct sometimes reaches far beyond the firm's control, such as a significant drop in the firm's valuation and stock prices, creating spillover effects, distrust among members, customer loss, and society at large. Therefore, it is noteworthy to explore for both theoretical and practical interest the extent of techno-ethical behavior an individual pursues and how the decision-making process is affected by various factors associated with technology usage. As unethical conduct can be attributed mainly to individual behavior (Jia, 2019), this study focuses on individual decision-makers and examines the role of their techno-ethical orientation in ensuring ethical decision-making (EDM) and corporate ethical values.

It has to be critically noted that a decision is a creation by man, which receives authorization from the environment, and is managed by people. Thus, every ethical or unethical decision and the conduct that results from it is, first and foremost, the outcome of human activity. Kranzberg's Laws of Technology states, "Technology is neither good nor bad; nor is it neutral" (Kranzberg, 1986, 2019; Lawton, 2009; Pitt et al., 2021); technology effect depends on the context and its interaction with the society. Similarly, Kranzberg's sixth law states, "Technology is a very human activity- and so is the history of technology." It clarifies that technology results from human activity and is treated merely as a human agent. Technology's unethical or ethical performance results from human moral and immoral actions. Technology is abstract as it is guided and operated by the ethical guidelines of its users. Therefore, despite the positive efforts by corporates to ensure ethical conduct of business, un-technoethical practices by employees are on the rise (D. Lee, 2020; Paludi et al., 2019; Veetikazhi et al.,

2022; Venkatraman et al., 2018). Abiding by the necessary government-imposed laws, such as practising corporate social responsibility and enforcing a code of ethics, proved to be rather abstract and not helpful in guiding techno-ethical orientation. The deployment of technologies in business for performance and continuity is not new, but the concerns of ethical aspects of technology usage are increasing, as do the penetration of technologies across all spheres of business operations. Consequently, studying the techno-ethics from the perspective of an individual will enable productive and ethical decision-making which in turn will ensure ethical values of corporate intact. Past literature on ethical constructs has been robust but fragmented. Researcher of this study attempts to add new knowledge to the ethical compendium of the intergenerational, decision-making model and corporate ethical values, with more opportunities to explore and integrate ethical and technological perspectives. Indeed, ethics studies are under-developed while looking at the special changes posed by technology. Therefore, Bunge (1977) also advocated the study of technology as a source of inspiration for ethics. The result is that both in terms of intensity and extensiveness, man affects nature through technology, which is independent of man's control (Turcan, 2017). Despite numerous studies being conducted in this area, the lack of identifying the integrated means of implementing techno-ethical behavior into the existing corporate values and decision-making system does exist. On these lines, the study findings shall add to the existing literature reviews of techno-ethics.

Purpose of the Study

The purpose of the study is to study and examine how we can measure the techno-ethical approach of individuals in this technology milieu, and whether there is a difference in the techno-ethical orientation across generations. This study also tries to investigate the role technology related factors in influencing the ethical decision-making model, and lastly, exploring the dimensions of techno-ethics and corporate value system in an organisational setting. This can help in the development of a framework of ethics in light of technology and internet penetration and to inform academic institutions, organisations, and individuals to be better prepared to make quick and ethical decisions with regard to technology usage. In this way, the research make dual contribution:

1) Develop and validate a techno-ethical scale first of its kind, and gain insights about the techno-ethical field by investigating the orientation and generational difference which were not considered in prior research works and

2) Identify the influence of technology related factors and digital citizenship behavior in the decision-making process and corporate ethical values at an individual and organisational level

Significance of the Study

To the best of our knowledge, no other study capturing the essence of techno-ethics from different perspectives has been undertaken in the past. This study is the first of its kind in technology ethics for four reasons. First, limited studies have been conducted in a multicultural setup such as India, which is at a crucial juncture of technological advancement and have faced the un-technoethical practices of greater intensity. Second, despite the concept of 'techno-ethics' being introduced in 1970s, there is marginal exploration on this field in terms of development and implementation in last 50 years. Third, this study attempts to identify and learn about the given field from differing perspectives, i.e., pre-millennial, millennial and post-millennial, which no previous studies have conducted. Fourth, the current study employs mixed method approach which helps the researcher to apply both inductive and deductive reasoning techniques for a more accurate answer to the study's research questions that cannot be completely answered through qualitative or quantitative research alone (Denzin & Lincoln, 2000).

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CHAPTER 2: LITERATURE REVIEW

Introduction

The review of past and existing literature on ethics, technology and techno-ethics helps in visualizing the past to evaluate the present for better understanding and development of future research. Literature review guides the understanding of *where it is* and *where it needs to go* in future. The study is aimed at knowledge advancement on techno-ethics, therefore, review of literature on the given field will help us to understand the breadth and depth of existing body of work, identify gaps to explore, test a specific hypothesis or develop new theories and to evaluate the validity and quality of existing work. Thereby, literature review enables re-working on identified weaknesses, inconsistencies and contradictions (Kraus et al., 2020; Mengist et al., 2020; Xiao & Watson, 2019).

This chapter provides a literature overview on the definitional, conceptual, dimensional, and theoretical facets of technology ethics. Initially, the theories and understanding related to ethics, technology and techno-ethics are presented. Then, the related concepts such as ethical decision-making, technological frames of references, corporate ethical values, and digital citizenship behavior are introduced.

Ethics

In the pursuit of defining and understanding the ethical or moral conduct, many ethical philosophers and scholars from a variety of disciplines have proposed universal and non-universal ethical theories. As advancements took place, new challenges require solutions from a new perspective. The concerns for ethics and moral values have touched all spheres of both personal and professional life. Throat-cut competition and intense business rivalry lead to a decline in business ethical standards (Cordeiro, 2003; Sroka & Lőrinczy, 2015). This gradual disturbance has attracted the attention of academicians and practitioners to revive the studies and exploration in the domain of ethics. A review of the ethics literature reveals that *ethics* is not easily defined. Based on the review of various research papers and books on ethics, the definition can be synthesized as following: *Ethics is the study of what is right or good human conduct. It consists of a standard or code of behavior of an individual with respect to his or her moral principles and values.* It is defined as a customarily practiced guideline, which influences human social behavior to protect and fulfill the rights of individuals (Marshall, 1999). Explanation of what is unethical and ethical is dependent on an individual's mental schema formed by themselves for analysing what is wrong or right. What seems morally correct

to someone may not be suitable for others as the moral schema or understanding of ethics is personal to one's mindset. Very often, ethics and morality are used interchangeably. This is primarily because an individual is considered ethical if he or she upholds certain moral values and moral principles in his or her conduct. In actual terms, morality acts as yardsticks of ethics. One's moral standards form a part of his or her ethical or non-ethical behavior. Moral behavior can be thought of as a process whose outcome or result dictates ethics. If the outcome is right for society, the behavior will be regarded as ethical or vice-versa. Morality involves individual character and disposition, but ethics are widely held in a group or society (Ghosh, 2018).

Ethics has been studied through different paradigms like deontology, teleology, utilitarianism, formalism, and consequentiality (Bennett & Robinson, 2000; Brady & Dunn, 1995; Brady & Wheeler, 1996). Mandal (2017) consider ethics as a value-based philosophy that is the foundation of happiness and success in life. Apart from differences in these approaches, the ethical benchmark also varies with culture, gender, generation, geographical locations, religion, and sects, and so on (VanMeter et al., 2013). All these differences make it a prerequisite to examining the 'ethical orientation' of the respondents.

Diverse subjective definitions of ethical orientation are available in the literature. Ethical Orientation may be referred to as "the set of enduring beliefs of a person which guide him/her in discriminating right from wrong, good from bad and moral from immoral, thereby helping him choose a proper mode of conduct" (Rokeach, 1968, 1973). According to Sullivan & Kymlicka (2007), ethical orientation may be defined as an individual's internal inclination towards ethical paradigms like deontology or another. And finally, as per Cambridge Advanced Learner's Dictionary (2008), 'ethical' is "relating to beliefs about what is morally right and wrong"; whereas orientation is "the particular preferences, tendencies, beliefs or opinion that a person has." Taking cues from the above definitions, it could be proposed that the ethical orientation is one's belief set regarding what is good, bad, right, or wrong. The world of ethics literature needs "new normal," that is application of classical or traditional ethical theories in a new domain. With this in mind, the emergence of applied ethics in a military, machine, medical, information, and technology, has widened the scope of research in ethics and enhances its never-ending quest of exploration.

Ethical Decision-making

The decisions good or bad, moral or immoral, impact our personal and professional life. Therefore, it is necessary to make good ethical decisions under different personal and working

situations. The process of ethical decision-making focuses on following principles of ethics, namely the principle of justice, the principles of rights and duties, the ethics of virtue and care, and the utilitarian principles. In a way, ethical decision-making demands attention to ethical considerations, introspection, and a disposition of fairness, justice and concern for people affected by the decision. These decisions act as an anchor for our ethical standards, moral values, social virtues, and attitude towards good and harmonious living. Ethical decision making involves using ethical principles to make decisions (Curtis & O'Connell, 2011). Drucker (1960) noted the principle of decision making could include all kinds of principles, such as the act of including unethical principles or decisions that lead to unethical outcomes. Agbim and colleagues (2013) noted the principle of decision making is essentially a two-step process. The first step is selecting and communicating the right principle to which decisions must adhere, and the second step requires the decision-maker to apply the appropriate principle (Agbim et al., 2013).

Decision-making is a critical process for an organisation's survival and success. Rationality and ethicality are two indispensable pillars of any organisational decision. Optimal outcomes emerge when leaders follow rational and ethical decision-making (Winkielman et al., 2007). Ethical decision-making (EDM) processes are generally based on rationalist and non-rationalist approaches. The rationalist approach assumes that a decision-maker uses a rational, logical, and deliberative cognitive process to conjugate moral standards (Schwartz, 2016). The most significant rationalist-based theoretical models of EDM are- Rest's (1986) four-component model for individual decision making and Jones' (1991) Issue-Contingent Model. Rest's four steps model includes ethical issue recognition, ethical (moral) judgment, ethical (moral) intent, and ethical (moral) behavior. This involves first identifying the issue in light of ethical components, then forming a judgement about the rightness or wrongness of the issue. After an ethical judgement, a behavioural intention is created that helps an individual to decide what he or she will do (or not do) regarding the perceived ethical dilemma. In the last stage of EDM, the individual actually performs according to his behavioural intention. However, individuals do now always behave consistently with either their judgments or intentions in regard to ethical issues. This is particularly a problem in the business context, as peer group members, supervisors, and organisational culture may influence individuals to act in ways that are inconsistent with their moral judgments and behavioral intentions

Jones' (1991) model, however, supplements the work of Rest (1986), Trevino (1986), Hunt and Vitell (1986), Dubinsky and Loken (1989) by focusing on traits of moral decision makers and on the ethical issue in determining ethical processes. Jones (1991, p. 367) argues

that EDM is issue-contingent and depends on moral intensity of the ethical issue (i.e., magnitude of consequences, probability of effect, social consensus, temporal immediacy, proximity, and concentration of effect). Other models of EDM by Dubinsky and Loken (1989) is founded upon the theory of reasoned action (Ajzen and Fishbein, 1980), which contends that individuals usually make systematic, rational and logical use of available information before arriving at a decision. The outcome of the decision or behavior is influenced by their behavioral intention, attitude and subjective norms (societal pressure to perform or not to perform the behavior).

These ethical decision-making models emphasize the rational cognitive-moral process decision-makers use and their ethical orientation towards resolving ethical dilemmas. It implies that moral awareness and ethical belief systems determine the ethical decision. However, as the system becomes complex, decision-makers cannot rely on their innate moral awareness only. While arriving at an ethical decision, decision-makers consider individual, organisational, and work environment factors (Herbert, 2010). They gather information or cues, process it, and act according to their innate moral sense. The rationalist approach emphasizes that various individual, organisational, and moral intensity-related factors influence the ethical decision-making process (Lehnert et al., 2015). The non-rationalist approach assumes that emotions (affective process) and intuitions (cognitive process) are central to moral judgment. One's "feeling state" (i.e., emotions) and "gut sense" (i.e., intuitive) are found to be more directly related to EDM. The non-rationalist approach places little emphasis on reasoning and more focus on people's behavioral adherence and emotional experience to their moral standards.

Ethical Decision-making in Technosphere

EDM at the workplace is gaining prime place because organisations, typically live in cyberspace which is dynamic, uncertain, and vague. The perception of ethics in the digital world slightly varies from traditional definitions because with technology and internet, recognition of right or wrong behavior gets complicated (Bolhari et al., 2017). When dealing with computers and the internet, ethical decision-making is a fundamental factor that influences the successful implementation and utilisation of IT systems. Numerous researchers have advocated for the importance of addressing the ethical issues in technology and internet usage due to the inadequacy of conventional theories (e.g., the theory of reasoned action) in modeing ethical decisions. Despite the best efforts by managers to ensure ethical practices in organisations, unethical activity by individuals is on the rise, hence, the importance of EDM will continue (De Cremer & Vandekerckhove, 2017; Zuber, 2015). Major moral theories

including utilitarianism, deontology and virtue ethics, have vigorously shaped EDM and provided sufficient evidence to measure what goes into making an ethical decision. Though numerous profiling instruments exist for EDM, most of them were developed and concentrated on moral cognitive aspects. For instance, defining issues test (DIT) by Rest (1979), Hunt and Vitell (1986, 2006), Jones & Ryan (1997), and managerial judgement test (MJT) by Lind (1998) were designed around Kohlberg's theory of moral development; managerial value profile (MVP) by Sashkin et al. (1997), and multidimensional ethics scale (MES) by Reidenbach & Robin (1990) focus on categorization of individual decision-making on ethical frameworks: utilitarianism, rights and justice. However, none of the instruments takes into account the self-virtues, or individual internal character traits (virtue ethics)-an essential aspect in influencing ethical decision-making (Casali, 2011; Crossan et al., 2013; Luca Casali & Perano, 2021). This dimension of virtue ethics is central to developing an ethical environment in any business or organisation. Virtuous traits such as equity, confidentiality, trust, compassion, loyalty, fairness and openness shape a person's and an organisation's vision thereby, enabling unity of character and integrity in a person (Audi, 2012; C. Chan & Ananthram, 2019; Shanahan & Hyman, 2003). Unlike other ethical principles, virtue ethics are intrinsic to business ethics that apply both deontological and teleological criteria when making ethical judgements. Businesses often apply and follow several universal virtues of autonomy, duty, equity, integrity, loyalty, legality, entrepreneurialism, honesty, honour, reliability, responsibility, etc. Similarly, scholars have argued that technology (an important resource for the organisation) must exhibit the same virtues to ensure techno-ethical decisions. A virtuous-oriented person aims at the right target and deepens his character strengths along with the right means through self-reflection (reflection-in-action). In this connection, an individual's reflection upon one's own or others' ethical or unethical conduct related to technology usage can foster techno-ethical decision-making. Hence, the optimum utilisation and successful implementation of IT systems in the organisation can be achieved. In turn, these practices will give rise to the ethical organisation.

Technology, Ethics and Ethical Decision-making

The proposed relationship between technology, ethics and ethical decision-making is theoretically premised on Social Cognitive Theory (SCT) (Bandura, 1988, 2011). The theory states that individuals' actions and motivation are regulated by forethought. Self-efficacy, outcome expectations, goals, and socio-structural factors are the core constructs of the social cognitive theory that influence one's behavior. SCT also provides answers to moral and ethical

orientation and decision-making (Claybourn, 2011; Galperin et al., 2011). This theory adopts a cognitive interactionist perspective on moral and ethical phenomena. Generally, SCT states that social and cognitive aspects influence behavior.

The social aspect of SCT focuses on an individual's actions being influenced by the environment and extraneous factors and conditions. It refers to an individual's capacity to evaluate one's behavior with environmental moral standards and set the future course of action by comparing past behavior outcomes and moral standards. The cognitive aspect focuses on personal attributes and thought processes influencing individuals' behavior. One's ethical orientation is regulated by self-assessment of their standard of conduct within environmental circumstances. As long as the gap between one's ethical behavior and environmental moral standards is less, the action will be deemed righteous. And, if the moral standards of the environment are far from one's cognition and thought process, those actions will be considered unethical.

Based on these considerations, SCT helps in analysing factors that influence ethical decision-making. It considers both the society's moral standards and one's ethical principles and how they interact while arriving at an ethical decision. In particular, employees' behavior towards technology is contingent upon rules and standards prevailing in the organisation, such as code of ethics and netiquette, and their expectations based on how the technology will serve individual needs. Thus, one's technology associated ethical orientation is poised to influence their decision-making prospects. Therefore, it is appropriate to state that people's attitude/orientation towards technology and its consequences, whether ethical or unethical, determines their moral judgment and decision-making.

Techno-ethics

With the emergence of applied ethics, ethical theories are being applied to diverse fields such as business ethics, engineering ethics, machine ethics, military ethics, publication ethics, and animal ethics, etc.(Luppicini, 2009a; Pereira & Lopes, 2020; Singhal & Kalra, 2021; Taebi et al., 2019). This application of ethics is extensive and attempts to apply theories of ethics to real-life situations. One of such streams that emerged due to the advancement in technology is known as "techno-ethics." The term "techno-ethics" was first coined by Mario Bunge (1977), who advocated the development of ethical and moral theories to deal with unique challenges posed by the rapid growth of information technology. According to Galvan (2003), techno-ethics is the "sum total of ideas that bring into evidence a system of ethical reference that justifies that profound dimension of technology as a central element in the attainment of a

finalized perfection of man." In other words, techno-ethics is an interdisciplinary field that deals with all the ethical aspects of technology (Verbeek, 2013). Techno-ethics provides a perfect amalgamation of technology and ethics as socially embedded enterprises. It focuses on identifying the ethical use of technology and preventing misuse of technology. Also, it tends to explore universal principles that guide technological advancement and its application for the benefit of society (Luppicini, 2009a, 2009b).

Techno-ethics ensures that the design, execution, and outcomes of technological progress should be beneficial in the long term. It is concerned with moral and ethical questions specific to the technology in society. The techno ethics approach involves integrating ICT practices and policies with ethical principles leading to ethically acceptable technology use. Techno-ethics derives from the moral and ethical belief system of an individual. Morality is a set of complex cognitive and emotional processes, every individual works according to their moral-cognitive schemas that shape their actions and behavior.

These new information technologies have given rise to hyper-connected society. Today, technology is not only between people, but it is also "getting under our skin and into our heads" (van den Hoven, 2017). The use of modern means of information technology and the internet has turned a wired society into a full-fledged digital community. Due to the burgeoning of the internet and computers in almost all walks of human life, figuring out what is ethical has become extremely complicated. Long ago, computers were fixed in offices due to their bulkiness and constant connection to the network. Now with the Internet and "palm top" technology, nearly everyone can now access the computers from anywhere, at any moment and by anybody. With rapid development of new and efficient products and technology that users are unaware of the ethical implications of their use, and there are no policies or laws to provide guidance on the issues involved. Moor refers to this as a "policy vacuum" (Moor, 1996). Researchers have explored ethical perspectives concerning technology use under various terms such as netiquette, information ethics, digital ethics, techno-ethics, etc. These domains provide insights into the ethical dimensions incorporated within technological systems.

Technological advances have mixed reactions from various philosophers and researchers. For instance, Heidegger (1977) and Ellul (1964) believe that technology is a threat to humanity; it has narrowed the perspective on reality, and individuals have lost control over technology. On the contrary, Karl Marx favors technological advances and felt positive about technology bringing a new communist society. According to Bunge (1977), the founding father

of techno ethics, technology, and ethics are highly interconnected and are socially embedded enterprises. They both cannot be separated, and this intricate interwoven relationship makes it complex to design ethically right technologies. Although organisational benefits of IT are unquestionable ironically, ethical concerns and dilemmas associated with the use of IT have tarnished its perfect image. Several researchers (Chatterjee et al., 2015; Geoff Moore, 2005; Prior et al., 2002; Tahat et al., 2014; G. Wood, 2000) have reported a disturbing trend of escalation of unethical use of information technology. The subject matter of information ethics includes privacy concerns, information security, intellectual property rights, and use of IT-enabled devices at the workplace, unauthorized access to other's machines and data, and piracy. These information technologies related to unethical practices are impeding the performance of the business organisations. The widespread availability and acceptance of digital technologies and the Internet have revolutionized the utilisation of information. Still, unfortunately, it has also offered immense scope for ethical breaches and ethical dilemmas (S. Sharma & Dev, 2018). Researchers have reported an escalating unethical use of technology by students, workers, teachers, and professionals across the globe (T. W. Kim et al., 2022; Mât et al., 2021; Otulugbu & Ogunobo, 2022; Smolinski et al., 2022). Cyberbullying, infringement of privacy, plagiarism, deception, stealing information, cheating, fraud, and defamation are a few challenges that erode technology's benefits. Researchers have stated that lack of techno-ethical training, generational differences, experience with technology, lack of resources, and non-existence of technology-related ethical guidelines are primary reasons compelling individuals to engage in unethical practices (Camilleri, 2012; Verma & Garg, 2022). To appreciate the benefits of technology for society, it is crucial to analyse technology usage through the lens of ethical principles guiding the behavior and actions of individuals.

Generational differences in techno-ethical orientation

The proliferation of technology has brought certain challenges for the society. One such challenging issue is the digital divide across different generations. Previous researchers including Purcell, Brenner, & Rainie (2012); Van Volkom, Stapley, & Amaturo (2014); Zickuhr & Madden (2012) highlighted significant differences in information technology usage across different generations. Although these studies vary in terms of sample, methodology, and design, they unanimously conclude that IT usage is relatively less among older generations. Similar to technology usage, researches have also reported considerable variations in ethical ideologies and ethical orientation among generation (VanMeter et al., 2013; Zabel et al., 2017).

Now, when information technology has become an indispensable part of human life, it is imperative to understand the techno-ethical orientation of different age cohorts.

The degree, direction, and status of human-technology interaction vary with age, gender, and other psychological and social factors like a generation. Many researchers concluded that the difference between the cohort (generations) is significant and substantial. The intergenerational differences in techno-ethical orientations are theoretically premised in generational theory (Mannheim , 1952), the uses and gratification theory (Katz et al., 1974), and the technology acceptance theory. As discussed above, the generational theory states that the age cohort that experiences and remembers the same social and political event develops similar values, attitudes, and expectations. The three generations (generation X, Y, and Z) have witnessed different stages of technological advancement, especially in India. As such, the differentiation of generations is done based on birth years. Generation X are those who are born between the 1960s-1980s ((Dimock, 2019; Gordinier, 2008)Pew Research Center, 2016; PricewaterhouseCoopers, 2017; Gordinier, 2008); Generation Y are those whose birth years range from the early 1980s to mid-1990s, i.e., till 1996 (Horovitz, 2012); and Generation Z is the cohort of people who are born from 1996 onwards till date (Dimock, 2019). Psychological, social, and demographical differences of these generations can be noticed in almost every field. For instance, millennial ethical mindset fluctuates between self-gratification and societal benefits (Boyd, 2010). While, Pre-Millennial emphasizes on need fulfilment in ethical ways, the focus of Post-Millennial is on self-fulfilment with little concern of ethical or unethical behavior. These diverse ethical orientations are not absolute, rather these age cohorts influences each other (Welanetz and Maloney, 2003).

The Indians of generation X did not have the luxury of IT and IT-enabled devices in their childhood and adulthood. Even in professional organisations, they either worked manually or through simple manual machines like typewriters. They witnessed an information technology revolution in the workplace only in their late-career with the bombardment of sophisticated and complex hardware and software. Through liberalization, privatization, and globalization in 1991, Indian opened its doors for the technology (Ravan, 2014). Thus, generation Y encountered IT-enabled devices in late adulthood or at the early career stage. Generation Z is the most privileged cohort that learns and cherishes advanced technologies from their childhood. These post-millennials are much benefitted from technology because computers and the internet have become a part of their educational environment whereby all students are taught how to use sophisticated tools of information technologies. Whereas, pre-

millennial and millennials are the ones who later adopted the technology (Bonfadelli, 2002; Doyle and Goldingay, 2012).

According to generational theory, these different social and technological experiences tend to develop different age cohorts. Previous researchers have also supported nation-specific generational studies (e.g., Egri & Ralston, 2004; Parry, 2014; Whiteoak et al., 2006). The use and gratification theory explains the relationship between psychological motives and technology use and behaviors. According to the theory, one selects and uses technology in a goal-directed manner to achieve gratifications and to fulfil its needs (Calvo-Porral & Pesqueira-Sanchez, 2019). And researchers like Magsamen-Conrad, Upadhyaya, Joa, & Dowd, (2015) reported significant variances in the way different age cohort use technology. Generational cohort influences usage and engagement with technology (Calvo-Porral et al., 2019).

Although few studies conducted by Boyd (2010); Wright, Marvel, & DesMarteau (2014) tried to explore techno-ethical orientation based on generational differences, literature still lacks a systematic comparative study of Pre-Millennial, Millennial and Post-Millennial especially in the Indian context. Whilst ethics researches are prominent in business, but there has been comparably little focus on the topic concerning technology use across generations. Such explorations are highly desirable in an age, where employees belonging to diverse generations work under a common roof. And, as a result of which, HR managers find it difficult to implement a uniform code of conduct in their respective organisations. Thus, it becomes necessary to learn more about the unexplored area which will serve as an important thrust for policymakers to strategize and implement policies accordingly. Looking from these perspectives, researchers argued that though the technology has intervened the privacy of people and changed the usage pattern of technology, it is considered as "new normal" because of the importance technology and computers holds in our lives. Although ethics is not a new concept however, its association with technology is new and different. Existing ethical aspects can't be applied on the technology. Hence, we proposed in this study that techno-ethics is "new normal".

Now, investigation of age cohort-based variation in techno-ethical orientation is important for country like India, who is witnessing a state of transition on multiple fronts i.e., demography, ethics, and technology. On population front, India is enjoying rich demographic dividend with 47% working age Millennial. According to the Census of India (2011), generation X is the fastest growing population segment in India, with a growth rate of 42%.

While, most of the western countries are struggling with old-age population, India's large pool of skilled labour looks promising for its future. As far as technological is concerned, India is witnessing information technology penetration and adaption at an unprecedented speed and zeal. Current generations are learning and adapting new technology with ease, older generations are still apprehensive. In India, information technology advancement started in the mid-1990s. And hence, those who are born after mid-1990s are well literate and equipped with computer and internet since birth. Interestingly, Post Millennial is much benefitted from technology because computer and internet have become a part of their educational environment whereby all students are taught how to operate computers. Whereas, pre-millennial and millennial are the ones who later adopted the technology or instead it was imposed on them to use technology and computers. Older generation often lack interest in computer and they are usually labelled as "technophobic"- fear of computers (Bonfadelli, 2002; Doyle & Goldingay, 2012). And on ethical front, India is traditionally regarded as conservative and ethically rich society. It has always valued collectivism over individualism, spiritualism over materialism, and character over worldly achievements. But, with the advent of information technology, new norms, values and morals are penetrating its culture. These multifaceted transitions have created a continuum of ethical orientations for native Indians. And one of the ways to study diverse orientations is comparison based on diverse generations. Although generation-based ethical positions are well researched, the studies to investigate techno-ethical orientation are scarce. The scarcity of such studies in the Indian context is very much evident from the fact that a validated and well-accepted scale to measure techno-ethical orientation is not available.

Technological Frames of References

A major premise of SCT is that people act on the basis of the interpretations of the world and in doing so enact particular social realities and endow them with meaning. Frames of reference held by organisational members are implicit guidelines that serve to organize and shape the interpretation of events and give meanings to their interpretations. To the extent that technology constitutes a core element in organisations, aspect of its member's organisation frames will concern technology. Most discussions of social cognition do not specifically address technology particularly instead emphasizes on technology strategy, innovation and change management. It is useful at least analytically to focus on the particular interpretation made about technology and its role in organisation.

Individuals use specific frames while using technology to make sense of it. These are called technological frames (TF) (Orlikowski & Gash, 1994). TF refers to an individual's

assumptions, knowledge, and expectations regarding the ethical impact of introducing and using certain technology at the individual, organisational, and cultural levels. These frames are the foundation through which 'we filter and then interpret the actions of others and our environment to make sense of our world' (Olesen, 2014). In an organisational setup, as socialisation or interaction occurs among members of the organisation, they develop common and shared frames in each department (Van Hulst & Yanow, 2016). Orlikowski and Gash posited that technological frames are assumed to be shared by individuals. And these shared frames guide the members' interactions around technology and their understanding and use of technology. Technological frames have powerful effects about the importance and role of technology which strongly influence the choices made regarding the design and use of technologies. Pinch and Bijker (1987) argue that because the technological artifact may be interpreted differently by multiple social groups, these groups will also construct different interpretations of it based on the interaction with it. Such interpretations differs among various groups due to knowledge base, context, artifact, and purpose of the members. With respect to technology in organisation, there are usually a number of important social groups which is called social world of computing, whose actions will significantly influence the process and outcome of technological change.

The theory of technological frames identified three domains of TFs relevant to the adoption of technology in a group: (1) the nature of technology- people's image and understanding of technology's capabilities and functionality; (2) technology-in-use- people's understanding of how the technology will be used and consequences associated with such use; (3) technology strategy- people's view of motivation or vision behind organisation's adoption of technology (Barrett, 1999; Shaw et al., 1997; Orlikowski and Gash, 1994). These three categories determine employees' perception of technology and are likely to enhance their interaction, influencing the organisation's decision-making process (Criado & O.de Zarate-Alcarazo, 2022). Building upon these categories, previous studies have directly assessed TF as a multi-item construct. Mishra & Agarwal (2010) differentiated between benefit, threat, and adjustment frames. DeVellis (2012) tried to measure TF on a single-item measure. Spieth et al. (2021)recently attempted to measure TF through a multi-item scale. Their scale explored the variety of individual reactions to technologies implemented by firms on five dimensions: personal attitude, application value, supervisor influence, organisational influence, and industry influence. All these dimensions influence the decision-making process. The present study is premised on this conceptualisation of TFs.

Moreover, as the concept of TF is derived from SCT, participants' frames and sense-making play a fundamental role in setting a decision criterion for adopting and using new technology. From a socio-cognitive perspective, TFs and sense-making (i.e., an individual's ability to attribute meaning to new, ambiguous, or equivocal situations or actions) are fundamentally social processes that apply to individuals and groups. They reflect the meaning and interpretations of people's actions and how they organise their decisions. Therefore, TFs are triggered when participants encounter uncertainty or ambiguity in their core meaning systems or identity while using technology. In line with the idea that TF is a part of social discourse and conditioned by cognitive structures, the notion of ethical decision-making is governed by the understanding of members' cognitive frames and the meaning they associate (Al Halbusi et al., 2017; Esmaili et al., 2021; X. Lin et al., 2018; Yun et al., 2019).

Furthermore, individuals' ethical or unethical use of technology can be exacerbated by a changing technological frame of reference. With the passage of time and advancement in technical systems, the frames changes, and so does the usage pattern by individuals (Tyre & Orlikowski, 1994). Individuals modify their frames or knowledge structure to make way for the effective utilisation of technologies and devices. In addition, effective utilisation of technology in an organisation depends on the congruence or incongruence of individual and organisational member (group) TF. If alignment (congruence) exists between structure and content, it contributes to effective utilisation of technology by organisational members. And, if incongruence is present in the frames of key organisational stakeholders' groups, problems such as resistance and unethical use of technologies may result (Orlikowski & Gash, 1994). It will be appropriate to state that understanding and interpretation of technological frames would be beneficial to ensure ethical decision-making. In this essence, researchers propose that ethical decision-making in organisations is governed by members' cognitive structures or technological frames, i.e., their assumptions, beliefs, and expectations concerning technology usage.

Digital Citizenship Behavior

Technology is considered a double edge sword. It can be seen as a paradox unique among tools. Technology can be used for the betterment of the system or society, or it can be used as a tool to manipulate and aggravate unethical practices. However, extant literature has identified two perspectives on technologies. Researchers argued that the human-controlled perspective views any good or bad, ethical or unethical practices using technologies determined by individual choices and decision-making. Technology should not be blamed as it is neutral,

and decisions about how to use them are more likely to be influenced by culture or society that shapes an individual's choices. The other perspective of considering technology as an autonomous unit that drives human activity is less discussed among scholars because the new spaces of information and communication created by the internet and technology have changed the roles of technology and those who control it. With everyday advancement and progress in the domain of newer and smarter technologies, the true nature of the technology is opaque to its users. Users often find different ways to use the same technology. Therefore, it is reasonably appropriate to state that humans control technology through their choices and cognitive schemas.

The growing rate of unethical practices, scandals, and cybercrimes has drawn the attention of policymakers, strategists, consultants, and the government to balance the growing demands of technology and its misuse. Ineffective management will cost a huge loss to a country and its citizens. Misuse of citizens' data will be detrimental to the security and sovereignty of a country. Therefore, researchers have emphasised the need to educate, be aware and protect the citizens (technology users particularly). In this digital era, users are responsible for ensuring the effective utilisation of the internet and technology that creates a safer, responsible, and respectable cyberspace for its community. In an attempt to keep control of malicious activities and enable legal compliance with the changing ethical considerations in technology development, the concept of "Digital citizenship" (DC) evolves.

Further, in the information and technology age, where the “physical” world is merged with the “digital” world, the nature of social conditions, relations, citizenship, and the flow of information has shifted from a moral and legal approach to a digital approach. Nowadays, the functioning, dissemination, conduct, and governance of organisations and their members are regulated by digital principles. The researchers have emphasised the development of virtual relations, techno-ethics, and digital ethics to guide the online behavior of individuals (Fernández-Prados et al., 2021a; Pastor-Escuredo & Vinuesa, 2020).

Consistent with this view, organisations have recognised the competence of digital technologies in shaping their organisational culture and climate. Organisations are training their employees on netiquettes and digital ethical activities to ensure ethical technology conduct. The employees are encouraged to showcase online respect and ethically approved behavior while working digitally. When an individual is able to participate responsibly in society online, it is termed DC (Mossberger & Tolbert, 2021; Shi et al., 2022). DC is an expression that involves norms and laws for regulating the digital environment (L. L. Chen et

al., 2021; Öztürk, 2021). DC refers to safe, ethical, and responsible online behaviors by internet users (Choi et al., 2017a; Oyedemi, 2020). It is defined "as a process by which individuals and groups committed to social justice deliberate and took action to build alternative and emancipatory technologies and technological practices" (Emejulu & McGregor, 2019, p. 140). Also, Richards (2010) referred to digital citizenship as "practices conscientious use of technology, demonstrates responsible use of information, and maintains a good attitude for learning with technology" (p. 518). Digital citizenship prompts the correct and appropriate use of technology (Tangül & Soykan, 2021). Numerous researchers like Christensen et al. (2021), Lauricella et al. (2020), and Örtegren (2022) have highlighted the dire need to examine the phenomenon of digital citizenship among internet users.

Various studies have conceptualised and developed the concept of DC in depth; however, the knowledge about how it is formed and influenced is unknown. Therefore, it is presumably relevant to investigate how an individual engages in ethical online behavior. The author of the study believe that one's ethical online conduct is influenced and formed by their ethical orientation related to the technology. The past studies on DC are limited to education, youth, rights, public policy, law, or governance (Domingo & Guerrero, 2018; Isman & Canan Gungoren, 2014; N. Sonck et al., 2011), but the current study investigates the factor influencing and shaping the DC i.e., techno-ethical orientation.

The citizens of a nation are expected to adhere to specific duties towards their fellow citizens and the country. Similarly, internet users are also expected to follow the code of ethics of online behavior. Researchers argue that digital citizenship is different from digital literacy (Jones & Mitchell, 2016). Digital literacy is the skill and knowledge related to computers and the internet, like understanding search strategies, privacy settings, theft, and cyberbullying resistant behavior, and avoiding spam and e-scams (Koltay, 2011; Nathalie Sonck et al., 2012). Researchers have suggested various dimensions of digital citizenship like digital rights and responsibility, digital communication, security digital, digital commerce, digital access, digital etiquette, and digital health and wellness (Isman & Canan Gungoren, 2014); Internet political activism, technical skills, local and global awareness, critical perspective, and networking agency (Choi et al., 2017a); digital skills and socio-civic skills (Peart et al., 2020); and online respect and online civic engagement (L. M. Jones & Mitchell, 2016).

Jones and Mitchell (2015) argued that teaching digital citizenship behavior will reduce the likelihood of immoral behavior perpetrated using digital technologies and the internet. They

observed that increasing incident of cyberbullying, sexting, harassment, and other unethical digital practices using Internet resources directly impact the lack of digital literacy education and digital civic appropriate training. Therefore, they developed a two dimension scale to measure digital citizenship behavior. The two dimensions, namely, online respect and online civic engagement, are believed to align closely with the conceptualisation of digital citizenship behavior in general. Previous researchers attempted to measure digital citizenship behavior using self-administered questionnaires. A literature review provides insight into various scales or instruments developed to measure digital citizenship (Choi et al., 2017b; Connolly & Miller, 2022; Fernández-Prados et al., 2021b; İmer & Kaya, 2020; Isman & Canan Gungoren, 2014; M. Kim & Choi, 2018; Phornprasert et al., 2020; Wones, 2009). Surprisingly, most publications and scale development are limited to college students only. However, the dimensions that emerged from the scales share common themes related to equal access, online respect, online education, and online civic engagement.

Developing countries like India are at a crucial juncture of technological advancement. With India progressively moving towards the digital era marked by technology shaping every aspect of lives, there is an ever-increasing dangerous challenge of online behavior. And unfortunately, there is a dearth of studies on digital citizenship in India. In their meta-analysis study, Richardson et al. (2021) reported that not even single research had been conducted in the Indian context. They observed that most studies were conducted in North America, the USA, and Turkey. Thus, developing and understanding digital citizenship among Indians is desired.

Corporate Ethical Values and Techno-ethics

Ethics and values are considered the foundation of an organisation that shapes the corporate culture. Values are primarily seen as "enduring beliefs that a specific mode of conduct is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence" (Rokeach, 1973, p. 5). Values give meaning to action and influence selection (Illes & Vogell, 2018, p. 352). Every employee upholds a distinct value and ethical system that influences their conduct at the organisation. The collective ethical orientation of individual employees and its formal and informal policies related to ethics comprise the corporate ethical values (CEV) of an organisation. These corporate values and philosophies influence the order in which business operations are conducted. CEV defines the ethical norms and orientation of the organisation. CEV is "a subset of organisational culture, representing a multi-dimensional interplay among various formal and informal systems of behavioral control" (Treviño et al.,

1998, p. 451). These "ethical infrastructures" (formal and informal systems) designed by ethical values aid in preserving and fostering ethical behavior in the organisation (Einarsen et al., 2017; S. R. Martin et al., 2014; Yonkova, 2022). Nicotera & Cushman (1992, p. 440) p. 440) opined that "any action can be judged as ethical if it upholds the value system of that organisation." Simply put, CEV help determine what is considered "right" and "wrong" based on the ethical orientation of individual employees and their formal and informal systems.

The organisation's ethical values channel the ethical business practices and set out the guidelines that shape the organisation's external adaptation and internal assimilation of resources (human and technology both). CEV can be perceived as an essential factor that reflects and influences the ethical mindset of employees. CEV impacts employees' perceptions regarding work behavior, performance, and motivation. Just as human values have undergone massive transformation and alteration due to the advent of the technology revolution; corporate values too have been revised in light of changing nature of technology and information. CEV can be perceived as a sum total of the values ingrained by the employees, personnel and other respective stakeholders. In this essence, it is right to point out that employees' ethical value shapes the CEV.

The organisation works in a technology-mediated sphere, and employees' ethical values related to technology contribute to the establishment of CEV. Therefore, this study explores the impact of an individual's techno-ethical orientation on corporate ethical values. The exact way in which techno-ethical orientation impacts CEV is unknown. As per the knowledge of the researcher, this study is the first to explore the interaction between techno-ethical orientation and CEV. Even though various former factors concerning ethical conduct have been examined, the results of the techno-ethical conduct of employees within the scope of an organisation have not been explored so far. The researcher of the study consider that the techno-ethical orientation would significantly shape corporate ethical values.

The relationship between techno-ethical orientation and CEV, has been explained using SCT (Bandura 1988). SCT is premised on triadic reciprocity, which involves the interaction of personal, environmental, and behavioral factors collectively influencing human behavior. The theory assumes that one's personal factors, such as moral thoughts, ethical orientation, values, behavioral components such as attitude, beliefs, affective reactions, and all other environmental factors determine the outcome of an action (Bandura et al., 1996). Accordingly, the author of the study posit that one's techno-ethical orientation governs and promotes the development of

corporate ethical values. Employees only act in a manner which is consistent with the values they encounter while working; therefore, the ethical orientation of all the employees in an organisation will collectively operate as an interacting determinant that influences and shapes the basis for corporate values (M. Chen et al., 2016; Trivellas et al., 2019; R. Wood & Bandura, 1989). Their ethical orientation will be reflected in the ethical context of the organisation, i.e., the corporate values of the organisation. A firm would engage in ethical conduct when its members endorse ethical orientation. And when employees behave ethically, corporate values strengthen.

CHAPTER 3: RESEARCH METHODOLOGY

Introduction

Ethics and technology related research had used a variety of methodologies to explore its dimensions, including model or scale building, experimental research using interviews, observations, case studies, empirical testing and longitudinal field studies. As discussed in earlier sections, the lack of scale development, generational difference studies, and organisational studies in the field of techno-ethics indicate a research gap. Therefore, to bridge the gap, this study employs various methodologies as per the objectives. Since this research seeks to continue and expand upon the decision-making and corporate ethical values in techno-ethical setting, both quantitative and qualitative approach is used wherein scale development is accompanied by a set of interviews with various stakeholders/generations involved in this study. A major advantage of mixed method research is that it enables researchers to simultaneously ask confirmatory and exploratory questions, thus verifying and generating theory in the same study. This mixed-method research design helps the researcher to apply both inductive and deductive reasoning techniques for a more accurate answer to the study's research questions that cannot be completely answered through qualitative or quantitative research alone (Denzin & Lincoln, 2000).

Research Design

A quasi-mixed method research design was used to achieve the research objectives and proposed hypotheses. A quasi-mixed method approach utilises collection of both qualitative (open-ended) and quantitative (closed-ended) data in response to research questions or hypotheses. The integration of both qualitative and quantitative research methods provide in-depth exploration of the topic and then aid in development of practical interventions. The quasi-mixed research design includes little or no integration of the two types of findings or inferences from the study (Teddlie and Tashakkori, 2006). Based on the research objectives, the focus of this study was quantitative in nature with little involvement of qualitative methods at few stages in the research. Although, the development of scale was achieved using quantitative aspect, however, the identification of the initial dimensions and antecedents of scale items were achieved using qualitative approach.

More specifically, exploratory sequential design was considered appropriate design type for the current study. Given the paucity of understanding and research on techno-ethics and its relevance in the extant literature, exploratory sequential design was employed.

Exploratory sequential design begins with exploring a topic through qualitative methods and then using the findings to develop a quantitative instrument and phase of the research study (Creswell, 2015). The analysed qualitative data may then inform the creation of interventions and strategies.

Research Questions

The present research contributes to the techno-ethics literature by developing and later examining the techno-ethical approach from the diverse perspectives that have not been adopted before. The model and scale development in this study aimed at exploring the new determinants of techno-ethical orientation. Moreover, looking at the scarcity of research on such an emerging field, this study seeks to address the deficiency in every possible aspect with a diverse perspective.

The main research question of the study can be formed as:

"What are the facets of techno-ethics from an individual, generational and organisational perspective?"

The research objectives for the study are stated as follows:

1. To understand the phenomenon of techno-ethics and its orientation
2. To develop and validate a scale to measure the techno-ethical orientation
3. Explore the inter-generational differences in technology oriented ethical behavior
4. Evaluate and assess the impact of techno-ethical orientation on ethical decision-making under the influence of technological frame of references
5. Investigate the role of techno-ethical orientation on corporate ethical values in the presence of digital citizenship behavior

Research Hypotheses and Framework

A set of hypotheses concerning techno-ethical orientation were examined in the current study. The objective is to develop a scale that can effectively measure the techno-ethical orientation and to examine if techno-ethical approach varies among different generations with varying levels of technology exposure. In response to the identified need to conceptualize techno-ethics from the perspective of different generations (i.e., Pre-millennial, Millennial, and Post-Millennial) and measuring its impact on ethical-decision making and corporate ethical values, this research was carried out across five phases which are detailed as below:

To address the thoughts related to techno-ethics, the author of the present study propose exploratory research to understand the trend and relevance of technology ethics since its

inception. Therefore, this study attempts to demonstrate the trend and future of techno-ethics in the last three decades through a bibliometric analysis. The research gaps were addressed by answering the following research questions:

1. What is the trend and growth of knowledge about techno-ethics in the past three decades?
2. What authors, journals, and documents in the literature on techno-ethics have contributed significantly over the past three decades?
3. What is the intellectual structure of techno-ethics literature from emerging areas?
4. What are the future research scopes to integrate ethics into technology to benefit policymakers, technology users, and society in general?

Objective 1- To understand the phenomenon of techno-ethics and its orientation

Subsequently, the researcher of this study utilised the themes and suggestions from the focus group with subject matter experts and from the past literature to develop an understanding related to techno-ethics. Using semi-structured interviews and focus groups, this phase of the study examined several questions related to techno-ethics:

1. How technology and ethics interact in a normal discourse?
2. What factors affect the technology usage?
3. How can we integrate ethics into technology?
4. What is "techno-ethics" and how it shapes an ethical technology usage?
5. How techno-ethics develops and varies across different groups and organisations?
6. How do technology and ethics interact to shape ethical decision-making?
7. How does a techno-ethical orientation influences corporate ethical value?

Objective 2- To develop and validate a scale to measure the techno-ethical orientation

Though the past literature has provided various well-established measures to assess the ethical orientation of an individual. Yet, most of the empirical studies of ethical orientation are solely grounded on measuring morality, ethical positioning, and ethical decision making. Several measures had emerged as a foundation in developing the scale for this study purpose. Existing measures include the Ethical Climate Questionnaire (ECQ) by Cullen et al. (1993), the Ethics Position Questionnaire (EPQ) developed by Forsyth (1980), the corporate ethical value scale (CENS) by Hunt and colleagues (Hunt et al., 1989), 20-item survey developed by Luther, DiBattista and Gautschi (1997) to assess ethical attitudes of students, and Unified theory of acceptance and use of technology (UTAUT) by Venkatesh et al. (2003). Neither one

of these measures, adapted or newly developed, has attempted to assess the technology oriented ethical behavior of individuals.

Based on the above-discussed premises, the present study intended to develop a scale for measuring the ethical orientation of Indians towards the use of technology. Based on the findings or inferences collected from above-mentioned qualitative data, a new measure called, Techno-ethical Orientation Scale (TEOS) was developed. Robust quantitative techniques like exploratory factor analysis and confirmatory factor analysis were used to extract the scale items that shapes the techno-ethical orientation.

H1: *This study hypothesize that the TEOS is a valid and reliable measure of techno-ethical orientation of diverse individuals within a particular culture.*

Objective 3- Explore the inter-generational differences in technology oriented ethical behavior

This phase of the study aims to validate the TEOS developed in phase 1 within a certain population particularly in India. For the purpose of the study, the developed scale was validated across different groups. A confirmed scale was assessed on participants from different generations in India. Accordingly, the following hypothesis is framed:

H2: *Pre-millennial, millennial and post-millennial differs significantly in their techno-ethical orientation*

Objective 4- Evaluate and assess the impact of techno-ethical orientation on ethical decision-making under the influence of technological frame of references

In this phase, the scale was validated and utilised in an organisation setup. Today, the organisations house employees from all the three generations (i.e., pre-millennial, millennial and post-millennial), therefore, validating the relevance and influence of techno-ethical orientation on the organisation's ethical decision-making in the context of technological frames of references is essential. It is proposed that an individual's techno-ethical orientation influences the ethical decision-making in the organisation, and accordingly, the following hypothesis is formulated:

H3: *Techno-ethical orientation is positively associated with ethical decision-making.*

An employee's attitude towards an option or stimulus serves as a primary basis for evaluating and assessing his actions. For instance, the resultant outcome would also be positive for an individual with a positive outlook on technology. A person's ethical orientation and personal attitude influence his ethical decisions. As a consequence, the hypothesis in this support is as follows:

H4: *: Personal attitude towards technology moderates the relationship between TEO and EDM*

As premised in SCT, the socio-structural factors facilitate or impede the actions or behavior. Researchers propose that if the technology can facilitate coordination of work, provide flexibility, and reduces the possibility of making mistakes, the decision-making process concerning technology usage would be positive and ethical. Application value strengthens the interaction between techno-ethical orientation and ethical decision-making. The hypothesis for the argument is as follows:

H5: *Technology's application value facilitates the relationship between TEO and EDM*

Ethical decision-making is regulated by environmental factors such as organisational policies, organisation climate, supervisor actions, and peer/group ethical schema. An organisation's management support facilitates ethical behavior by employees. The organisation's and its members' support facilitate effective employee engagement with ICT (O'Driscoll et al., 2010). The organisation's inclination towards implementing technologies at the firm and its effort in providing assistance and training to participants enable better and more ethical decision-making at the organisation. Researchers have empirically identified that general organisational support is leads to positive employee outcomes such as enhanced productivity and job satisfaction, better employees' well-being that allows better decision-making. According to social exchange theory, employees are motivated and produce high-quality output when they feel that the organisation supports them (Park et al., 2018). For instance, if employees are well trained to utilize technology, they are more likely to contribute high-quality value to the organization in terms of profitability, employee retention, job engagement, etc. Therefore, this study assumes that organisational factors facilitate the association between techno-ethical orientation and ethical decision-making. The proposed hypothesis is as follows:

H6: *Organisational factors facilitate the relationship between TEO and EDM*

Also, previous researchers have reported that people tend to engage in poor ethical practices if their superiors or peers are not ethical (Odole, 2018; Ünal et al., 2012). Supervisors' willingness and behavior regarding technology use determine the interaction between an individual's techno-ethical orientation and ethical decision-making. Supervisor's or manager's support aids in influencing employees' attitude and behavior, including technology usage and decision making. Especially, supervisors are expected to play a vital role in encouraging the employees to work with a new approach, support them during the transition period from

traditional techniques to modern and tech-enabled techniques, and guide them in applying the competencies that they have learned in the workplace while ensuring job security for the employees (Park et al., 2018). Recent studies have found that managers' support mediates the relationship between organisational support and innovative behavior (Crowley and Bourke, 2018; Gözükara and Çolakoğlu, 2015; Huo *et al.*, 2020; Zhang *et al.*, 2008). It states that employees are more likely to get influenced by the supportive approach of the managers. Likewise, studies have emphasized the facilitating role of senior managers or middle managers in the implementation of innovation and quality development initiatives (Engle et al., 2017; Sönmez & Yıldırım, 2019). Accordingly, the following hypothesis framed is as follows:

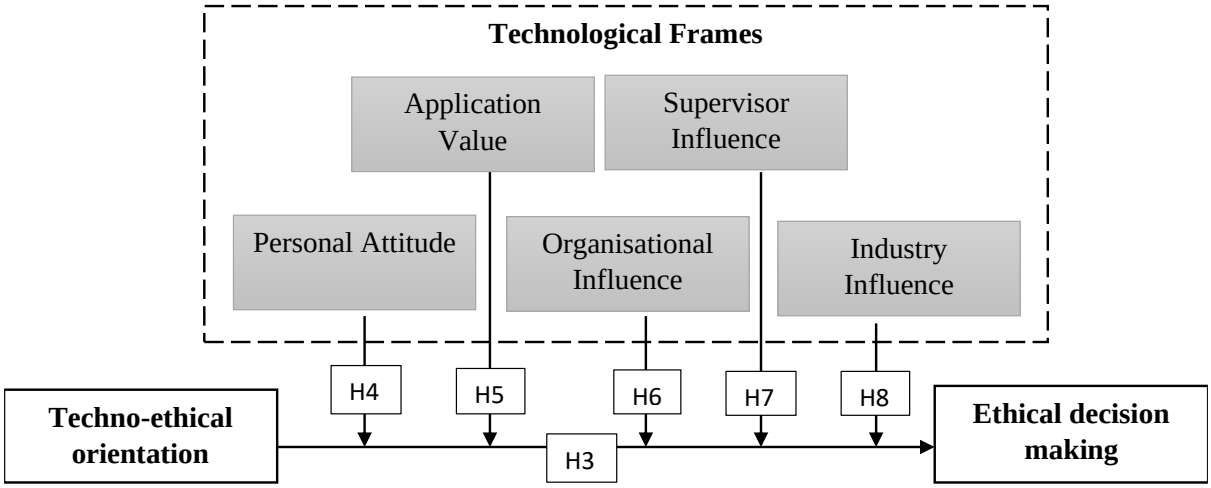
H7: *Supervisor's support facilitate the relationship between TEO and EDM*

Similarly, with the automation and development in technology and ICT devices, the working of the industry ecosystem smoothens and advances. Moreover, researchers have reported differences in technological usage and adoption across industries (Kutnjak et al., 2019; Oh & Shim, 2020; Shrestha, 2021). Industries using IT systems have reported growth in operating profit margins and higher labour productivity (Bessen, 2017, 2020; Franceli & Zilber Turri, 2021). The extant literature has shown that deploying IT and using IT knowledge in managing the organisation's activities is one of the prime success factors (Basheer et al., 2016; Nasiri et al., 2020). Consequently, the industry significantly influences the relationship between techno-ethical orientation and ethical decision-making. The proposed hypothesis is as follows:

H8: *Industry factors facilitate the relationship between TEO and EDM*

In a nutshell, the present study posits that techno-ethical orientation and technological frames (i.e., personal attitude, application value, organisation influence, supervisor influence, and industry influence) play an important role in ensuring ethical decision-making. And the interaction between techno-ethical orientation and ethical decision-making is moderated by technological frames. Figure 1 presents the research model and hypotheses to achieve the objective 4.

Figure 1: Research Model of Objective 4



Source: Primary data

Objective 5- Investigate the role of techno-ethical orientation on corporate ethical values in the presence of digital citizenship behavior

This last phase of the study tests the influence of techno-ethical orientation and digital citizenship behavior on corporate ethical values. The present study hypothesises that the collection of individual ethical orientations will frame an organisation's value system. Consequently, the research hypothesis is as follows:

H9: *Techno-ethical orientation significantly influence the corporate ethical values*

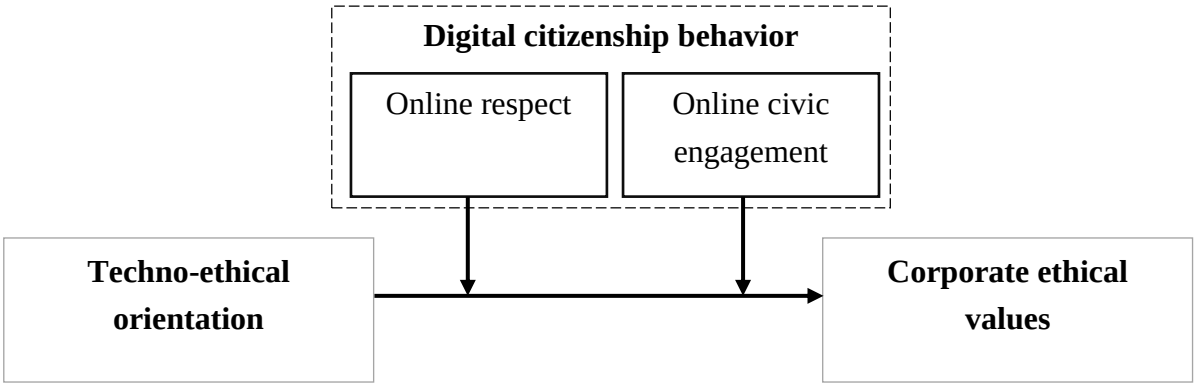
Also, it is presumed that an organisation's values are influenced by the ethical orientation shared by its members. Moreover, the corporate ethical values would be reinforced by the interaction of an employee's ethical orientation and his digital civic appropriate behavior. It is believed that combining a techno-ethical mindset and respectful online behavior towards others can be considered a boost in framing corporate ethical values. Engaging in behaviors that benefit the common good of society can improve the development and formulation of corporate ethical values. In a nutshell, the researcher hypothesise:

H10: *Online respect moderates the relationship between techno-ethical orientation and corporate ethical values*

H11: *Online civic engagement moderates the relationship between techno-ethical orientation and corporate ethical values*

The research framework delineated from the above-stated hypothesis is presented in figure 2 below.

Figure 2: A proposed research framework for objective 5



Source: Primary Data

Sampling and Data Collection

The population inclusion criteria for the study was established in accordance to the stated research objectives.

Objective 1

To understand the conceptualization of techno-ethics and subsequent development of scale items, both qualitative and quantitative research techniques were utilised. Firstly, the review of literature and focus group interviews defined the study's boundaries and an operational definition of the techno-ethical orientation. Afterwards, use of quantitative approach like pilot study establishes the final statements of the questionnaire. These sources of qualitative and quantitative evidences are important in evaluating whether items are psychometrically sound and appropriate for all relevant subgroups.

Literature Review

The previous chapter (Literature Review) lists the detail of the literature associated with technology, ethics and techno-ethics. The review has been utilised to refine the possible scale items describing the relevant dimensions. The existing ethical, technology acceptance scales and questionnaires were examined, and statements were framed. Based on literature review, personal observations and the researcher's personal experience, the items were framed and presented to the respondents for a focus group discussion.

Focus group interview

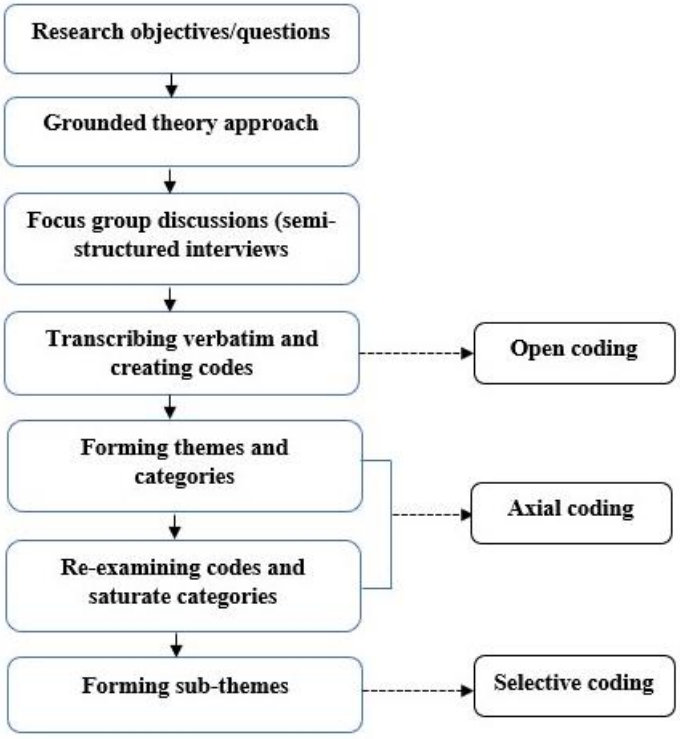
The use of focus group solicits the evidence on the validity of interpretations made from the literature review. The focus group sessions enable the participants to talk about the issues

they think are important, describe their experience in detail and provide rich data about the concern with descriptions. On the basis of first set of related contexts associated with techno-ethics generated from review of literature, three focus group discussions, each comprised of eight participants were conducted. However, there is no standard rule for sample size in focus group discussion but a group of eight to ten participants is considered optimal (Hennink et al., 2019; Sim et al., 2018). The first focus group sample include participants from IT, education, consultancy sectors etc. The participation of managers, employees, and strategist is vital to synthesize the concept of techno-ethics in real sense. The second focus group consisted of students, whose perspective regarding technology ethics were vital because these students will enter the workplace in next 2-3 years. And the third focus group consisted of experts and policymakers. The experts such as philosophers, lecturers, researchers, scholars, policymakers in public and private organisations, etc., who particularly work in the field of technology ethics and had quantifiable experience and expertise in the integration of technology and ethics were approached. Their experience provided crucial insights that contributed significantly towards the generation of items. A preliminiary questionnaire that incorporates the conclusions of the focus groups was prepared with the purpose of further refining the items and aspects.

In total, 24 respondents out of the 54 contacted participated in the study. The focus groups were: (i) professionals (n = 8, with n = 2 managers, n = 3 teaching faculty, n = 2 company executives, n = 1 technology consultant); (ii) students (n = 8, with n = 3 undergraduate students, n = 5 post-graduate students); and (iii) experts (n = 8, with n = 2 research scholars, n = 2 software developers, n = 2 policymakers and advisor for government of India, n = 2 lecturers teaching subjects related to technology and ethics).

The procedure utilised for generating the themes and codes from the focus group discussion is presented in Figure 3 below.

Figure 3: Procedure for the focus group study



Source: Primary data

Objective 2 and Objective 3

In the first study, the targeted sample consisted of employees working in different industries in India. Based on the level of technology usage, age and experience with technology, the suitable respondents were approached either through emails or personal visits. An online questionnaire comprising demographic variables and twenty statements was created using Google form. Informed consent of participants was sought by requesting them to click on a check box. Also, participants were promised confidentiality and strict academic usage of the collected data. As many as 425 people were approached, but only 350 respondents returned the questionnaire. Out of these 350 questionnaires, 48 were discarded for being incomplete or being negligently filled (Meade and Craig, 2012). This sample of 302 participants was divided into two subsamples using systematic sampling such that odd and even responses were included in the first and second subsamples. Among the pool of 302 responses, 58 participants belong to the pre-millennial group, 111 participants from the millennial group, and 133 respondents from the post-millennial group. Among the pre-millennial cohort, 63.8% were male, and 36.2% were female. From the millennial group, 40.5% were male, 57.7% were female, and 1.8% were the third gender.

Similarly, the post-millennial group consists of 56.4% males and 43.6% females. Based on Industry wise distribution, in millennial cohort, 50% of the respondents belong to Education industry followed by 11% from Information and Technology Industry. Similarly, 36% of pre-millennial were from Education Industry followed by 24% from Manufacturing and 12% from Information and Technology sector. For post-millennial, almost half of the respondents i.e., 59% of them were from Education industry followed by 25% from Finance and Insurance Sector. The purposive sampling was used to ensure that employees of all three generations are approached. The descriptive statistics related to the participants is provided below in table 1.

Table 1. Descriptive Statistics

Variable	Cohort	Category	Frequency	Percentage
Gender	Pre-Millennial	Male	37	63.8
		Female	21	36.2
		Third Gender	0	0
		Total	**58**	**100**
	Millennial	Male	45	40.5
		Female	64	57.7
		Third Gender	2	1.81
		Total	**111**	**100**
	Post-Millennial	Male	75	56.4
		Female	58	43.6
		Third Gender	0	0
		Total	**133**	**100**
Qualifications	Pre-Millennial	Graduate	21	36.2
		Post Graduate	26	44.8
		Professional Course	4	6.9
		Doctoral/MPhil	7	12.1
		Total	**58**	**100**
	Millennial	Graduate	19	17.3
		Post Graduate	81	73.6
		Professional Course	3	1.8
		Doctoral/MPhil	8	7.3
		Total	**111**	**100**
	Post-Millennial	Graduate	58	44.3
		Post Graduate	42	30.5
		Professional Course	33	25.2
		Doctoral/MPhil	0	0
		Total	**133**	**100**

Source: - Primary Data

Objective 4

The data were collected through an online survey using cross-sectional and purposive sampling methods. Inclusion criteria for the study required that participants be engaged in the supply chain industry and have substantial experience working with technology for business

operations. A total of 388 responses were received through emails and social media platforms. Forty-two responses were discarded for being incomplete and invalid. The sample included 346 employees working in India (Table 2). The survey questionnaire was shared and posted on various online platforms such as Google Groups, Yahoo Groups, LinkedIn, and some companies' internal discussion groups and forums for maximum reach and responses. Among these respondents, 45.3% were in the age group of 25-35 years, followed by 21.0% below the age of 25 years, and 16.7% in the age group of 45-55 years. Also, 69% of the participants had more than five years of technology experience in their work life. Gender-wise, 66% were males, and 34% were females. The participants' marital status and working experience were also captured. 44% of the participants had work experience between 5-10 years in supply chain companies, followed by 32% of participants with more than 10 years of work experience. Also, almost half of the participants were married, i.e., 55%, and 45% were unmarried.

Table 2: Demographic characteristics of respondents (N=346)

Variable		**Frequency**	**Percentage**	**Cumulative %**
Gender	Male	227	66%	66%
	Female	119	34%	100%
	Total	346		
Age	Below 25 years	73	21.0%	21.0%
	25- 35 years	157	45.3%	66.3%
	35-45 years	44	13.0%	79.3%
	45-55 years	58	16.7%	96%
	Above 55 years	14	4.0%	100%
	Total	346		
Marital Status	Married	190	55%	55%
	Unmarried	156	45%	100%
	Total	346		
Work experience	Less than 5 years	83	24%	24%
	5-10 years	152	44%	68%
	More than 10 years	111	32%	100%
	Total	346		
Experience with Technology	Less than 3 years	22	6%	6%
	3-5 years	85	25%	31%
	More than 5 years	239	69%	100%
	Total	346		

Source: Primary Data

Objective 5

The data were collected via online survey using a cross-sectional sampling method and structured questionnaire. The sample consists of working professionals having substantial experience of operating technology at workplace. The questionnaires were converted to google form with relevant sections capturing demographic and participants' responses on study

variables. A total of 565 responses were received through emails and nineteen responses were discarded for being incomplete and invalid. The final sample included 546 participants working in India. 41.95% were female participants and 58.05% were male participants (Table 3). Majority of the respondents i.e., 41.76% belong to age group of 25-35 years followed by 22.53% in the age bracket of below 25 years. In terms of marital status, 58.24% were married and 41.76% were unmarried. Similarly, industry based distribution of sample was taken and 26.92% participants belong to education sector followed by 24.18% participants from pharmaceutical sector. The least number of the participants i.e., 3.85% were from banking/PSU sectors. Since the study includes employees, therefore, their work experience and educational background was also determined.

Table 3: Demographic characteristics of respondents (N=546)

Variable		Frequency	Percentage	Cumulative %
Gender	Female	229	41.95%	41.95%
	Male	317	58.05%	100%
Age	Below 25 years	123	22.53%	22.53%
	25- 35 years	228	41.76%	64.29%
	35- 45 years	110	20.15%	84.44%
	45- 55 years	74	13.55%	97.99%
	Above 55 years	11	2.01%	100%
Marital Status	Married	318	58.24%	58.24%
	Unmarried	228	41.76%	100%
Highest Qualification	Undergraduate	201	36.81%	36.81%
	Post-graduate	233	42.68&	79.49%
	Doctorate	112	20.51%	100%
Course	Technical	108	19.79%	19.79%
	Non-Technical	438	80.21%	100%
Work experience	0-5 years	226	41.40%	41.40%
	5-10 years	108	19.78%	61.18%
	More than 10 years	212	38.82%	100%
Industry	Education	147	26.92%	26.92%
	IT/Software	84	15.38%	42.3%
	Pharmaceutical	132	24.18%	66.48%
	Banking/PSU	21	3.85%	70.33%
	Consultancy	55	10.07%	80.4%
	Engineering/Construction	49	8.98%	89.38%
	FMCG	28	5.12%	94.5%
	Others	30	5.50%	100%
Total		**546**		

Source: Primary Data

Instrumentation

Since the study follows quasi-mixed method design, therefore, at some phases the researcher adopts certain instruments to achieve the study's objectives. This section details the

measures used for the purpose of the study. The objective 1, objective 2 and objective 3 entails exploration of scale items, dimensions, and intergenerational differences with the use of focus groups, literature review, pilot study etc., therefore, instruments were particularly used to achieve the objective 4 and 5.

Techno-ethical orientation scale

A 14-item scale developed and validated by Verma and Garg (2022) was used to measure the techno-ethical orientation of the employees across four dimensions, namely infringement of right to privacy, self-enrichment, defamation, and loafing during work hours was used. The responses were collected on a five-point scale ranging from 1 (highly unethical) to 5 (highly ethical). Sample items included "Not giving due credits to someone for providing project-related material," "Copying software from the organisation for personal use," and "Discussing negative aspects of the colleagues or organisation with others on the internet" (see Appendix A).

Ethical decision-making scale

A 24-item scale developed by Casali (2011) was used to capture the profile of ethical decision-making styles on a five-point Likert scale ranging from 1 (extremely important) to 5 (not important at all). Some sample items included "respecting dignity of those affected," "giving the opportunity to all affected parties or their representatives to have input into the decision-making process" (see Appendix B).

Technological frames of reference scale

A 20-item scale developed by Spieth *et al*. (2021) capturing the dimensions of technological frame construct in the digital age on a seven-point scale ranging from 1 (strongly disagree) to 7 (strongly agree) was used. The word 'digital technologies' from the original scale was replaced with the word 'technologies' to suit the purpose of this study. Sample items included "Technologies reduce the possibility of making mistakes in my work," "Technologies are an important part of my life," and "Our customers demand the use of technologies" (see Appendix C).

Digital citizenship scale

Employees' digital citizenship behavior was measured using the youth digital citizenship scale developed by Jones and Mitchell (2016). It is an eleven-item scale that rates two dimensions of digital citizenship (online respect and online civic engagement) on a five-point scale ranging from "not at all like me" to "very much like me." A few scale statements are "I think about making sure that things I say and post online will not be something I regret

later," "I do not add to arguments and insulting interactions that happen on the Internet," and "I am careful about how I say things online, so they don't come across the wrong way." (see Appendix D).

Corporate ethical values

A corporate ethical values scale developed by Hunt et al. (1989) was used to capture the employees' perception about the prevalence of CEVs in their organisation. It attempts to capture the degree to which organisations take an interest in ethical issues and act in an ethical manner, rather than product, service or other related issues. Sample items include "Managers in my company often engage in behaviors that I consider to be unethical" and "Top management in my company has let it be known in no uncertain terms that unethical behaviors will not be tolerated." First two items of this scale were reverse coded. All the items were rated on a five-point likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). (see Appendix E).

Details of research outline

The following table 4 provides an in-depth look at the procedures that were carried out at each of the aforementioned stages of the process.

Table 4: Overview of methods adopted

Objectives	Qualitative Phase	Quantitative Phase
Objective 1	Semi-structured interviews, focus groups, literature review	Not applicable
Objective 2	Expert judgement, panel discussion	Pilot study, factor analysis, EFA, CFA
Objective 3	Not applicable	Reliability, validity testing, one-way ANOVA
Objective 4	Not applicable	Descriptive statistics, correlation, regression, moderation, CB-SEM
Objective 5	Not applicable	Descriptive statistics, correlation, regression, mediation, CB-SEM

Source: Primary data

Common Method Bias

Since the data were collected from a single survey at one time, common method bias may be a concern in this study. Since the same respondents provided the measure of independent and dependent variables, it might result in artifactual covariance or socially desirable responses that would potentially seriously affect research findings. Podsakoff et al. (2003) suggested procedural and statistical control remedies to avoid the common method biases. First, relying upon a single format for either the scale or scale anchors is one of the

major sources of common method bias. In order to minimise the impact of common method variance, the constructs were measured on a different point scale. In addition, psychological separation of measurement was created by using a cover story to make it appear that the measurement of the independent variable is not connected with or related to the measurement of the outcome variable. This technique reduces the respondent's perceived relevance of the previously recalled information or their prior responses to answer subsequent questions. It reduces the consistency in their responses (MacKenzie & Podsakoff, 2012; Podsakoff et al., 2011). Second, the marker variable technique (Lindell & Whitney, 2001) was used as a statistical approach to test for common method bias. Essentially, the marker variable technique uses a variable theoretically unrelated to any substantive variables being studied to calculate the influence of common method variance and adjust the correlations among all constructs (Jordan & Troth, 2020; Schwarz et al., 2017). Researchers incorporated a six-items marker variable-Gratitude (GQ-6) to assess individual differences in the proneness to experience gratitude in daily life (McCullough et al., 2002) and Brief Resilience Scale (BRS) (B. W. Smith et al., 2008) measuring an individual's ability to bounce back from stress, consisting of six items. Results showed the lowest correlation between the marker variable and the remaining variables, and the obtained adjusted correlations are significant. Thus, it is evident that common method bias was not a pervasive issue.

CHAPTER 4: RESULTS & DISCUSSION

Introduction

This chapter entails the description and findings of the analysis conducted to achieve the stated objectives. This section is organized by first providing the results of bibliometric analysis to capture the essence of existing research in the context of ethics and technology. Using the results of keywords, authors, journals, articles and co-authors obtained from the bibliometric analysis, the focus group interviews were conducted. Then, the themes and codes generated from the focus group discussion to achieve an understanding of the techno-ethics are presented. Direct statements from participants are used to precisely represent the opinions, beliefs, and content of the participants.

The procedure used to develop and validate the techno-ethical orientation scale are presented in detail along with the factors obtained. At group and organisation level, the method of analysis and moderation analysis results are represented along with the interpretations of the findings.

Data Analysis and Findings

Bibliometric analysis

The quantitative approach of a bibliometric analysis was applied allows a comparison of history and existing research pursuit in the given field and exploration of future research development areas (Albort-Morant et al., 2017; Cadavid Higuita et al., 2012; Gaviria-Marin et al., 2018). Bibliometric analysis is conducted across two categories: performance analysis and science mapping analysis (Cobo et al., 2011, 2015; Donthu et al., 2021). The former technique evaluates the publication and citation-related metrics (e.g., *h*-index, total citations, total publications, *i*-index, co-authored publications etc.) to examine the contributions to a given field, while the latter technique focuses on structural and intellectual interactions among research constituents (Donthu et al., 2021; Gaviria-Marin et al., 2018). The science mapping shows the relationship between the diverse research constituents using citation analysis, co-citation analysis, bibliometric coupling, co-word analysis, and co-authorship analysis (Khanra et al., 2021; Tunger & Eulerich, 2018).

The current study employs both techniques to profile the overall state of literature available on techno-ethics and address the research's RQs. VOS viewer software was used for science mapping due to its powerful and reliable visualization and network analysis covering the intellectual structural nature of the research field (Heersmink et al., 2011; Valenzuela et al.,

2017; Vallaster et al., 2019). An overview of the methodology adopted for the bibliometric study of the current study is presented in Figure 4.

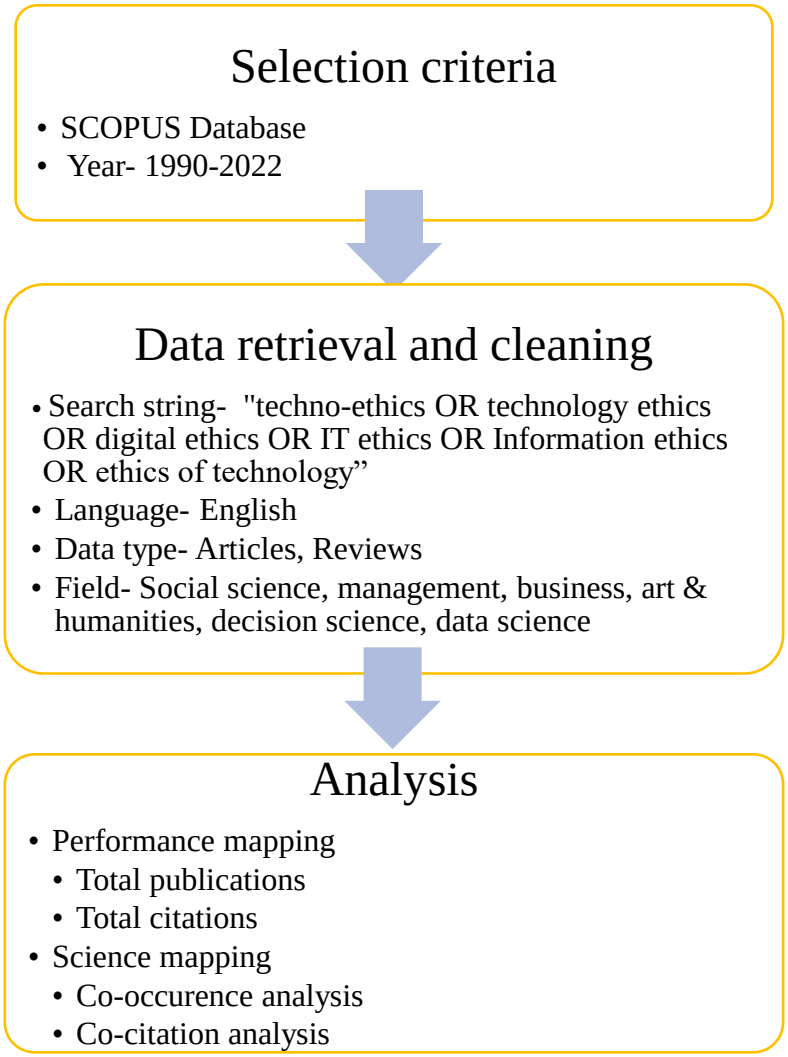
Data extraction

Bibliometric data used in this study was extracted from the Scopus database, the largest multidisciplinary abstract and citation database of peer-reviewed literature in social science research with over 82 million documents, 1.8 billion cited references, 7 thousand publishers, and around 17.6 million author profiles (Scopus, 2022). Scopus content predominantly covers health sciences and social science subjects (Mongeon & Paul-Hus, 2016). Compared to the *Web of Science* (WOS), Scopus has extensive coverage as it captures the most reputable international journals with 24,169 titles. At the same time, WOS includes only ISI-indexed journals, limited to 12,491 titles (Caviggioli & Ughetto, 2019; Doulani, 2020).

Keywords and search results

To construct the data set for further analysis, a preliminary review of prior literature informs the use of several terms, such as “techno-ethics,” “technology ethics,” “digital ethics,” “ethics of technology,” “information technology ethics,” “artificial intelligence ethics," "cyber ethics," and "computer ethics," to represent the coverage and concept of "techno-ethics." Following the objective of the study, the aim is to cover the relevant and broader concept of technologies. Technologies here include all kinds of applications and devices for information and communication. Therefore, the researchers did not limit the search to a specific area of technology use, such as AI ethics, computer ethics, etc. Thus, the search string "techno-ethics OR technology ethics OR digital ethics OR IT ethics OR information ethics OR ethics of technology" was finalized. Since technology and the internet were introduced post-1990s for communication and information processing purposes worldwide, the researcher of this study captures the literature from the 1990s onwards till date, i.e., around three decades. Accordingly, the result generated a data set of 1477 items. After limiting the search to the English language and a particular data type, including articles and reviews, 1212 items were found suitable for the analysis. The study did not consider newspaper articles, editorials, conference papers, and other document types found in the database as articles and review papers provide "certified and reliable knowledge." (Danvila-del-Valle et al., 2019; Ramos-Rodrígue & Ruíz-Navarro, 2004). In addition, this study focuses on the contribution of the research related to techno-ethics in business, management, social sciences, art & humanities, and decision science; therefore, the original data set comprises 679 records. The procedure applied for conducting the bibliometric analysis is summarised in figure 4 below:

Figure 4: Proposed methodological approach followed for bibliometric analysis



Source: Primary Data

Descriptive Statistics

Descriptive statistics provide an overview of the research contributions made in the given field by profiling the distribution among various categories. Descriptive statistics on techno-ethics explain journal-wise publications and citations extracted from the Scopus database. Table 5 displays the Top 10 journals contributing the most to articles related to techno-ethics in the past three decades. The most popular journals making a sizeable contribution to the number of techno-ethics articles published are *Ethics and Information Technology (EIT)* (53 articles), *International Journal of Technoethics (IJT)* (42 articles), *Journal of Information, Communication and Ethics in Society (JICES)* (38 articles), *Science and Engineering Ethics (SEE)* (32 articles), *Journal of Information Ethics (JIE)* (24 articles)

including others (refer to Table 5). Interestingly, the publishing house of the journals listed in Top 10 is from the Netherlands, followed by the United States and the United Kingdom. This indicates these three countries are contributing substantially to the research development and institutionalization of the ethical principles governing technology creation and use. As techno-ethics is still developing and requires more scrutiny, the number of journals contributing to the research is limited compared to other social science and management topics. The results of the table project a potential opportunity for a researcher(s) in the field of techno-ethics to ascertain the future possible research lines and collaborations. The total publications, total citations, and citations per publication of each journal, along with other index-related metrics such as cite score, h-index, SNIP (Source Normalized Impact per Paper), and SJR (SCImago Journal Rank), are presented in Table 5 below. The findings show that the knowledge about the integration of technology and ethics is growing substantially, and there is a need to work towards its cogitation.

Table 5: Journal-wise distribution of the top 10 most active journals of articles

Journal Title	TP	TC	CPP	Cite score	h-index	SNIP	SJR
Ethics and Information Technology	53	1933	36	5.6	58	2.922	1.328
International Journal of Technoethics	42	189	4	1.4	12	0.549	0.174
Journal of Information, Communication, and Ethics in Society	38	172	4	2.3	21	0.594	0.355
Science and Engineering Ethics	32	1255	39	7.4	59	1.994	1.073
Journal of Information Ethics	24	41	1		12	0.63	0.113
Philosophy and Technology	23	283	12	6.4	33	3.359	1.45
Journal of Business Ethics	18	472	26	10.8	208	2.863	2.438
AI and Society	14	229	16	3.9	33	1.295	0.59
International Information and Library Review	12	59	4	1.6	27	0.99	0.3
Minds and Machines	9	594	66	8.4	44	3.251	1.555

Source: Scopus database, 2022, Scimago journal, country ranking, and authors' calculations.

Note: TP- Total publications, TC- Total citations, CPP- Citation per publication, SNIP- Source normalized impact per paper, SJR- SCImago journal rank.

To accomplish an understanding of the research questions, the database was analysed in two components: performance analysis and science mapping.

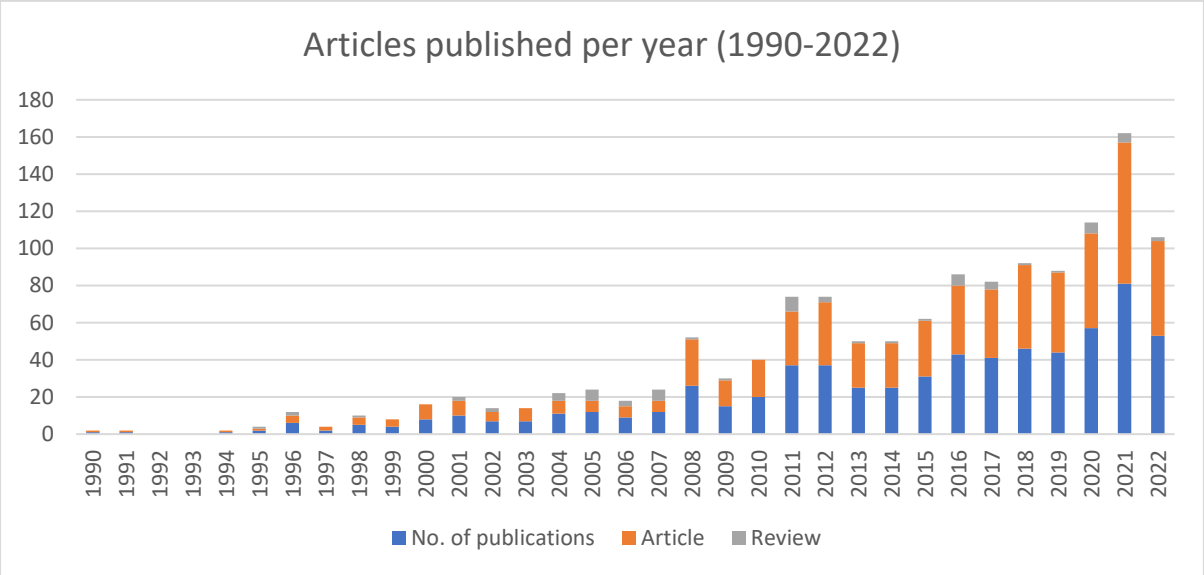
Performance analysis

Performance analysis comprises publication-related metrics, citation-related metrics, and citation-and-publication-related metrics (Bornmann et al., 2014; Donthu et al., 2021). Each metric contains measures such as total publications, number of contributing authors, total citations, collaborative index, *h*- index, etc. To capture the performance trend of techno-ethics research, the authors believed that the number of total publications and citations would sufficiently portray the landscape of research contributions.

All the items extracted from the database were collected for around three decades, i.e., from 1990-2022. Figure 5 below highlights the number of articles related to techno-ethics published between 1990- 2022. In 2007-2008, the number of articles was scant, indicating the usual seminal timeframe for a concept to evolve and take shape. The research related to techno-ethics gained steady momentum from the year 2011. From 1 article in 1990 to 53 articles about diverse research constituents, the graph reflects a widening extent of development in the given field.

Moreover, after looking at the trend, most researchers worked on preparing an article, and only a few reviewed the topic. The database covered three decades, during which only 68 review papers and 611 article papers were launched and published. The results also highlight the growing trend and research directions to explore further and address the discussion on the integration of ethics and technology in business, social science, management, and humanities. Exploring potentially new and multidisciplinary areas in greater depth might prove helpful in an endeavour to work towards techno-ethics. The findings support the answer to research question related to trends and growth of knowledge about techno-ethics in past three decades. and summarise the necessity to examine the enduring relationship between the variables carefully.

Figure 5: Year-wise publications of the article on techno-ethics between the years 1990 and 2022



Source: Scopus database, 2022 (30th of September) and authors' calculations

Table 6 shows that in terms of citations, *"AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations"* article by Floridi *et al.* (2018) was a highly cited article in the context of techno-ethics with 444 citations in total. The article presents a synthesis of five ethical principles in the development and adoption of AI in society. The authors of the article also introduced opportunities and risks associated with AI that support good AI development for the benefit of society (Floridi et al., 2018). Interestingly, the author "Floridi, L." is the most cited and influential author, with almost six articles in the top 10 list. Floridi, L. and others, through their articles, covered the evolving nature of incorporating ethics into technology. He studied the integration of ethics in AI, information, Big Data, and computer. Besides, the authors extend the philosophical aspect of ethics to the applied field of science and technology. Such research emphasizes the significance of ethical theories in a technosphere environment. The second most influential article "The Ethics of Big Data: Current and Foreseeable Issues in Biomedical Contexts", authored by Brent Daniel Mittelstadt and Luciano Floridi has 281 citations. The article provides a narrative for the ethical implications of Big Data to guide ethicists, data scientists, regulators and other stakeholders. The meta-analysis explained the eleven themes forming a framework for the ethical assessment and governance of Big Data practices (Mittelstadt & Floridi, 2016). The foci of these articles reinforced the earlier analyses and can be considered an extension of the existing literature on technology and ethics. Similarly, the rest of the articles in the list primarily captures the essence

of techno-ethics in three areas: 1) identifying the characteristics of factors influencing ethical behavior intention of individuals using information systems, technologies and communication devices; 2) providing a narrative on modelling ethics in the information systems while ensuring the privacy of data and information; 3) developing a framework to guide and monitor the ethical assessment of modern and emerging technologies and information systems such as AI, Big Data, cloud computing etc.

Another interesting finding that emerged from the table 6 is that the articles in the field of techno-ethics are too old. Almost half of the articles were published before 2010, and the rest were published after. This highlights that before the year 2010, i.e., for almost two decades, the research and literature available on the given field were scarce. The explanation for limited research lies in two factors. First, scholars who worked actively in the initial decades up to 2000 or 2005 were disadvantaged by the relatively small number of scholars, journals, and limited technology adoption and use during this era. Second, the database was limited to articles and review papers indexed in Scopus. The exclusion of books, book chapters, and conference papers related to techno-ethics has kept the other influential articles and research papers out of the list. Many important and relevant books on techno-ethics which have explicitly examined different facets of ethics integration into technology are available in a different database. Other data sources mainly cover theories and practices related to socio-technical aspects of technology (Cottrell, 1999; Einar Himma, 2007; Luppicini, 2009a; Wang et al., 2022). With technologies developing and changing at a fast pace, it will be inaccurate to neglect the role of ethics and morals in shaping technology usage. The results satisfactorily addresses the research question related to what authors, journals and documents in the literature on techno-ethics have contributed significantly over the past three decades.

Table 6: Most cited and influential articles published between 1990 and 2022

TC	Title	Authors	Year
444	"AI4People—An Ethical Framework for a Good AI Society: Opportunities, Risks, Principles, and Recommendations"	Floridi, L., et al.	2018
281	"The Ethics of Big Data: Current and Foreseeable Issues in Biomedical Contexts"	Mittelstadt, B.D, Floridi, L.	2016
242	"Information ethics: On the philosophical foundation of computer ethics."	Floridi, L.	1999
212	"Modeling IT Ethics: A Study in Situational Ethics"	Banerjee D., Cronan T.P., Jones T.W.	1998
161	"What influences IT ethical behavior intentions—planned behavior, reasoned	Leonard, L.N.K., Cronan T.P., Kreie J.	2004

	action, perceived importance, or individual characteristics?"		
141	"What Values in Design? The Challenge of Incorporating Moral Values into Design"	Manders-Huits, N.	2011
132	"The Ontological Interpretation of Informational Privacy"	Floridi, L.	2005
129	"On the intrinsic value of information objects and the infosphere."	Floridi, L.	2002
114	"From What to How: An Initial Review of Publicly Available AI Ethics Tools, Methods and Research to Translate Principles into Practices" "An empirical investigation of anti-spyware software adoption: A multitheoretical perspective."	Morley J., Floridi L., Kinsey L., Elhalal A. Lee Y & Kozar K.A.	2020 2008
100	"Anticipatory Ethics for Emerging Technologies"	Brey, P.A.E.	2012

Source: Scopus database, 2022, and authors' calculations. Note: TC- total citations

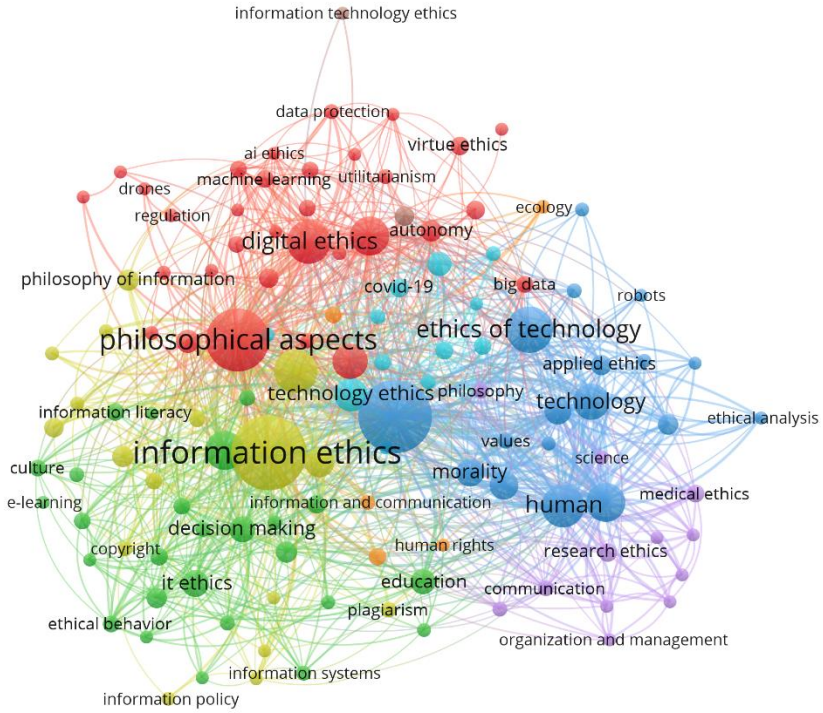
Science Mapping

Science mapping portrays knowledge sharing, co-creation, and enhancement on a particular topic under study (Cobo et al., 2011; Morris & Van der Veer Martens, 2008; Van Raan, 2004). It uncovers the "latent relationships and phenomena in the structure of science via visual imagery" (Doulani, 2020). It connects authors, documents, and keywords that emerged in history, giving way to what is currently known on a given concept. The intellectual structure of techno-ethics is uncovered based on co-word occurrence analysis and co-citation analysis.

Figure 6 below shows the 123 terms referred to as keywords forming 8 clusters with at least five occurrences each. The most commonly co-occurring keywords were "information ethics" (168), "ethics" (161), "philosophical aspects" (118), "ethics of technology" (63), "digital ethics" (58), and "privacy" (57). Though "information ethics" emerged as the most frequently used keyword, the keyword "ethics" (597) has the highest total link strength, followed by the keyword "philosophical aspects" (409) and "information ethics" (396). On sorting the keywords based on the year of their emergence, "ethical technology", "AI", "machine learning", "digital ethics", and "e-learning" appeared as a highly co-occurring keywords in the last decade (2010-2022). Similarly, the keywords "computer crime", problem solving" "ethical behavior", and "ethical decision making" were quite popular during the year 2000-2010. The

emergence of "covid-19" was reasonably expected given the role of technologies in combating and managing isolation, lockdown, and work from home during the covid-19 pandemic.

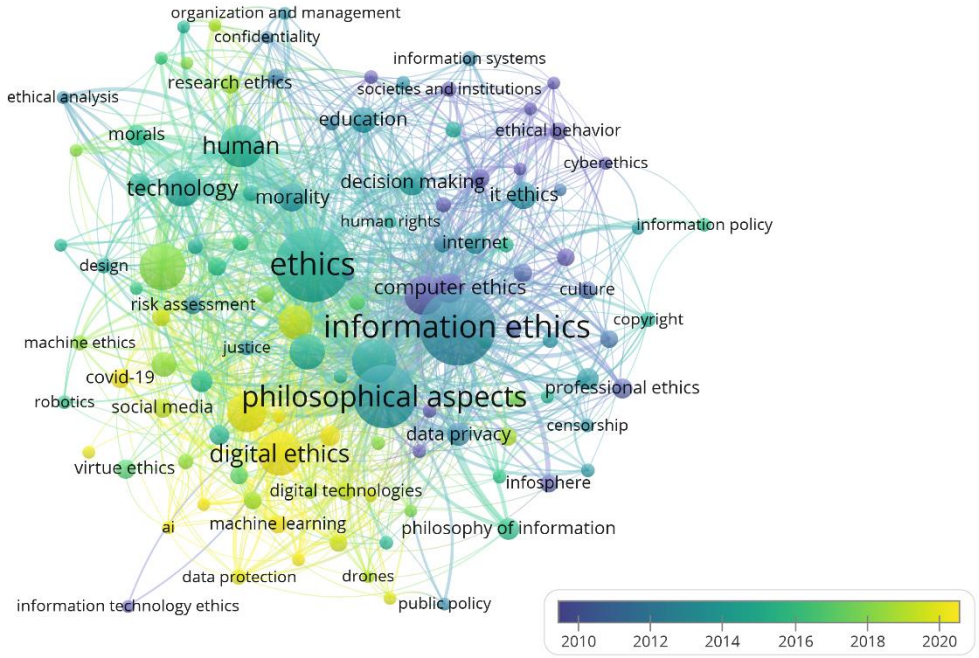
Figure 6: Keywords co-occurrence map



Source: Authors using VOSviewer software. Note- The size of the nodes indicates the most frequent keyword studied in the context of techno-ethics.

The overlay visualization analysed the association of ethics with diverse concepts generated along the progress of technology in the last decade. Figure 7 below assesses the occurrences of words that markedly revolves around techno-ethics. For instance, in the initial year from mid-2005 to 2010, *ethics, philosophy, copyright, information, morals, confidentiality, surveillance, regulation, and public policy* are the most repeated areas in the database. It indicates that during the period when research on techno-ethics was setting the ground, the main areas of concern were policy, laws, regulations, trust, information ethics, setting standards for ethical technology development, and making technology a responsible innovation. As newer technologies develop from 2015-present, *robotics, machine learning, virtue ethics, digital ethics, drones, social media, AI ethics, and autonomy* are the most prevalent topics. Currently, the world is hyper-connected with AI, machine learning, and robotics; therefore, visualization explicitly distinguishes between the technologies used in the past. Table 7 below clearly explains the major keywords that emerged during a particular period. The clusters are formed based on the frequency of a keyword; therefore, they overlap.

Figure 7: Overlay visualization of main areas in techno-ethics



Source: Authors' calculations using VOSviewer software

Table 7: Evolution of terms/keywords associated with techno-ethics

Year	Keywords emerged
Cluster 1: 2015-2021	AI, AI ethics, algorithms, big data, data protection, digital ethics, digital technologies, social media, robotics, governance, machine learning
Cluster 2: 2012-2015	Values, machine ethics, morals, morality, ethical analysis, applied ethics, sustainability, technology adoption
Cluster 3: 2008-2011	Computer software, decision-making, ethical decision-making, ethics education, information technology, IT ethics, problem-solving,
Cluster 4: 2008-2010	Copyright, censorship, infosphere, cyber-ethics, transparency, censorship
Cluster 5: 2012-2019	Policy, drones, intellectual property, data privacy, innovation, emerging technologies, surveillance, laws, and legislation
Cluster 6: 2012-2014	Informed consent, responsible innovation, ethics, confidentiality, communication, human
Cluster 7: 2012-2014	Freedom, human rights, internet, standards, technology ethics, trust
Cluster 8: 2016-2018	Digital citizenship, information literacy, e-learning
Cluster 9: 2004-2005	Information technology ethics, responsibility

Source: Scopus database, 2022, authors' own interpretation and presentation

Keywords that emerged from the database are categorized into various clusters. Cluster 1: Ethics of emerging technologies- AI, Big Data & Drones; Cluster 2: IT ethics and problem

solving; Cluster 3: Ethics and values in design and engineering; Cluster 4: Cyber/computer ethics in business and society; Cluster 5: Standard of ethics research; Cluster 6: Technology adoption and ethics for sustainable development; Cluster 7: Infosphere; Cluster 8: Information technology ethics. Each cluster describes a different theme related to the evolution and integration of ethics into technology.

Table 8: A co-occurrence network analysis of current research in techno-ethics

Cluster Label	Current research
Cluster 1: Ethics of emerging technologies- AI, Big Data & Drones	Adoption of AI, big data, and machine learning has revolutionized and benefitted both technology developers and users (Duncan & Culver, 2020; Green, 2021; Henschke, 2020; Kazim & Koshiyama, 2021; K. Martin & Waldman, 2022; Santoni de Sio & Mecacci, 2021)
Cluster 2: IT ethics and problem solving	The research in this cluster represents a differing dimension of the technology to solve problems and enable individual, group, organisational, and societal decision-making for economic and societal benefits. The research focuses on providing learning related to ICT to combat cybercrimes and enable its optimum utilisation (Devon, 1999; Hawamdeh et al., 2022; Spector, 2016; Thomas & Ahyick, 2010; Walstrom, 2006)
Cluster 3: Ethics and values in design and engineering	Technology and ethical principles are applied and researched in engineering and design domains for emerging new problems. The research focused on practising ethics in research and innovation. Scholars proposed an ethical analysis of information warfare and addressing ethical problems engendered by this warfare (Brody, 2003; Didier, 2000; Grunwald, 2000; Guo et al., 2022; Introna, 2005; Papadimitriou et al., 2022; Swartz et al., 2022; Taddeo, 2016; Taylor & Moynihan, 2002; Tschaepe, 2021)
Cluster 4: Cyber/computer ethics in business and society	It encompasses research related to embedding ethics into the computer system to enhance the cyberspace environment. It concerns the ethical usage of cyberspace. Researchers argue the growing incidents of cybercrime, data stealing and other computer-associated crimes. (Floridi, 2005; Fuchs et al., 2009; Giaxoglou, 2017; Kennedy, 2013; Mcbride, 2014; Ncube & Dube, 2016; Spinello, 2012; Tavani, 2001; Volkman, 2015)
Cluster 5: Standard of ethics research	Researchers attempt to review information and communication technology ethics compliance and internet governance and propose the need to establish a standard for evaluating ethical conduct using technology. Besides, the scholars outline society's preparedness for using robotics and artificial intelligence. They also debated whether the internet protects and fosters human rights. (Cath & Floridi, 2017; Torras, 2019; Verma et al., 2022; Wachter, 2018; Yusuf, 2021)
Cluster 6: Technology adoption and ethics for	Whether ICT can manage general sustainability other than environmental issues? To synthesize the understanding of this question, researchers expanded the application of technology, ICT,

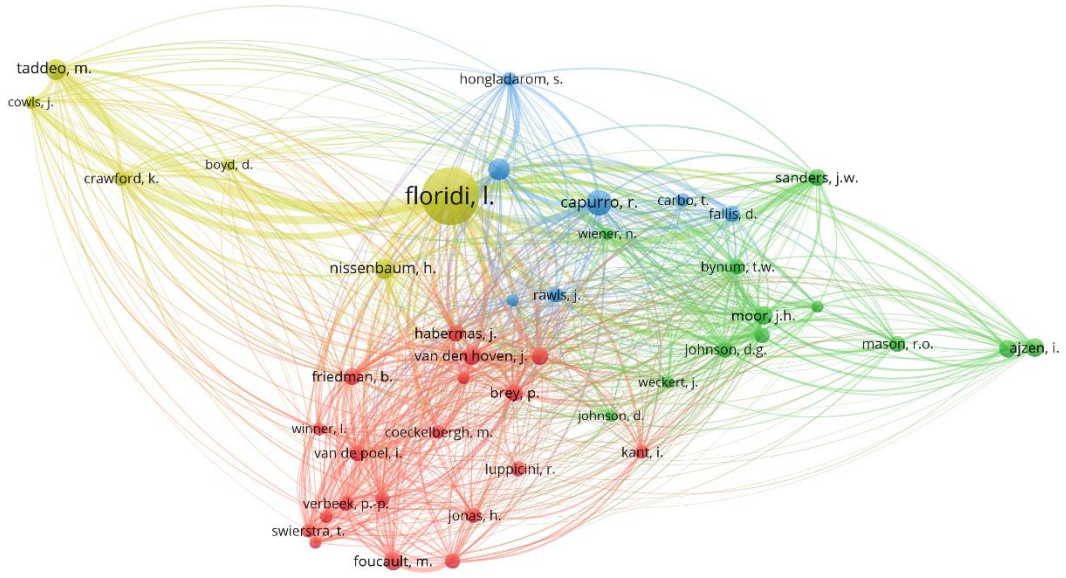
sustainable development	and the internet to the concept of sustainability. They address the role of technology in sustainable digital education and ethically sustainable designs. Moreover, attempts were made to expand the conceptualization of technology ethics and the adoption of emerging technologies. (Brey, 2012; Brown, 2014; Kavathatzopoulos, 2015; Searle, 2016; Tse et al., 2015)
Cluster 7: Infosphere	This cluster focuses on bringing the creation, organisation, dissemination, and use of information within the ambit of ethical standards. The information is stored mainly in technology-enabled devices; therefore, this puts an additional demand to regulate the information from the perspective of ethical principles. (Capurro, 2008; Hongladarom, 2017)
Cluster 8: Information technology ethics	Scholars discussed and studied the best way to integrate ethical issues in this information age. (Dillon, 2010; Nehari-Talet, 2011; Peslak et al., 2007)

Source: Scopus database, 2022, authors' interpretation and presentation

The first identified cluster covers the recent research on emerging technologies- AI, Big Data, robotics, and machine learning. The cluster location in the map and dense cross-cluster links with keywords such as data protection, AI, regulation, drones, machine learning, and big data evidence the concentration of research on modern and emerging technologies. These findings concerning topic frequency are largely consistent with other recent reviews (Bhat, 2018; Cheng *et al.*, 2018; Christoforaki and Beyan, 2022; Hajjo, 2018; Kazim *et al.*, 2019; Kazim and Koshiyama, 2021; Floridi, *et al.*, 2020; Shao *et al.*, 2022; Siau and Wang, 2020; Vayena *et al.*, 2018). The cluster's current size indicates that there is a high potential for these emerging technologies to overtake the other clusters. Moreover, the cluster was found linked to “covid-19” which indicates the role of these technologies in overcoming the repercussions caused by the pandemic. In addition, the cluster was linked to "virtue ethics" and "utilitarianism", which evidences the relevance of traditional theories of ethics in solving and analysing the recent topical trends. Cluster 3 concentrates on applying ethics in the engineering and design domain. This cluster's research revolves around the association between morality, values and science. The researchers attempted to embed ethical principles in the design and development of machines. Further, the researchers critically evaluate the development and use of machines and devices on ethical parameters. Previous research has also established the relevance of teaching and embedding applied ethics in addressing the development and utilisation of engineering devices (Aydemir & Dalpiaz, 2018; Ocone, 2020; Sandler, 2020; N. M. Smith et al., 2021). The results satisfactorily address the research question about the intellectual structure of techno-ethics literature from emerging areas.

The co-citation network shows who has cited whom to understand the theoretical foundations of the documents in the sample. The initial screening of cited references was narrowed to at least 30 citations, resulting in four clusters. The VOS viewer provided a network analysis of co-citations based on documents and authors. These clusters represent a distinct school of thought enhancing the landscape of knowledge about techno-ethics. Figure 8 below offers an insight into the most cited authors in the documents' references. For better clarity and understanding, table 6 below explains the links and co-citation of the top 10 highly co-cited authors. Consistent with the results of the most influential articles as presented in the table 6, Luciano Floridi emerged as the highly co-cited author with the largest nodes on the map. James H. Moor, Deborah G. Johnson, Bernd Carsten Stahl, Rafael Capurro, and Helen Nissenbaum are highly co-cited authors sharing a similar research interest on computer ethics, internet ethics, technology policy, machine ethics etc. Based on their current affiliation, the universities from the United States and the United Kingdom emerged as the top institutes collaborating and co-citing the work in techno-ethics.

Figure 8: Co-citation network of cited authors in the references of techno-ethics documents



Source: *Authors' calculations using VOSviewer software*

Table 9: Top 10 most co-cited authors in cited references

Authors	Links	Area of interest	University	Active years
Luciano Floridi	190	Information ethics, internet ethics, AI ethics	University of Oxford	2000-present
James H. Moor	172	Computer ethics	Dartmouth College	1985-present

Deborah G. Johnson	171	Computer ethics, engineering ethics, technology ethics and policy	University of Virginia	1985-present
Bernd Carsten Stahl	169	Information systems, information ethics, responsible innovation, business ethics	University of Nottingham	1988-present
Rafael Capurro	166	Information ethics, communication research, ethics and morality	Hochschule der Medien University of Applied Science	1985-present
Helen Nissenbaum	162	Privacy, computer systems, information security, internet, machine learning	Cornell Tech	1993-present
Philip Brey	154	Surveillance, privacy, human-computer interaction	University of Twente	1995-present
Herman T. Tavani	154	Cyberethics, cyberstalking, privacy, machine ethics	Rivier College	1995-present
John E. Sanders	152	Computer ethics, computers	University of Oxford	1995-present
Batya Friedman	152	Human-computer interaction, technology policy, value sensitive design	University of Washington	1990-present

Source: Scopus database, 2022.

In addition, Table 10 provides an overview of co-citation network analysis based on cited references of documents and their research objectives. The clusters formed are described as follows: cluster 1- Ethics in design, engineering, and science, cluster 2- Computer ethics, cluster 3- Information, technology and ethics, and cluster 4- Ethics for the latest technologies and data science.

Table 10: Co-citation network of cited references in techno-ethics

Clusters	**Reference**	**Research areas/topics**
Cluster 1: Ethics in design, engineering, and science	Foucault, M.; Van Den Hoven, J.; Brey, P.; Stahl, B.C.; Habermas, J.; Friedman, B.; Van De Poel, I.; Heidegger, M.; Verbeek, P.; Luppicini, R.; Jonas, H.; Latour, B.; Kant, I.; Coeckelbergh, M.; Swierstra, T.; Verbeek, P.P.; Winner, L.; Vallor, S.; Ihde, D.	• Ethics of emerging information and communication technologies • Engineering and design ethics • Ethical impact of technological advancements and applications in society • Techno-morality • Applied ethics of AI, machine learning • Value-sensitive design
Cluster 2: Computer ethics	Moor, J.H.; Ajzen, I.; Cronan, T.P.; Sanders, J.W.; Johnson, D.G.;	• Computer ethics • Internet ethics

	Mason, R.O.; Bynum, T.W.; Tavani, H.T.; Weckert, J.; Wiener, N.; Rogerson, S.; Johnson, D.	• Ethical assessment of new technologies
Cluster 3: Information, technology and ethics	Capurro, R.; Ess, C.; Fallis, D.; Rawls, J.; Carbo, T.; Hongladarom, S.; Nussbaum, M.C.	• Digital ethics • Ethics and robotics • Information ethics • Virtue ethics • Ethics and responsibility • Business ethics
Cluster 4: Ethics for the latest technologies and data science	Floridi, L.; Taddeo, M.; Nissenbaum, H.; Crawford, K.; Cowls, J.; Boyd, D.	• Ethics in data science • Ethics of big data • Ethics of AI • Ethics and accountability in a computerized society

Source: Scopus database, 2022, and authors' calculations.

Overall, the cluster formed shares a common ground according to their research areas. For instance, in cluster 4: ethics for latest technologies and data science, the authors listed as most cited in the references of the documents have a common estate of research in data science and its constituents (AI, Big data).

The findings revealed that techno-ethics is an emerging field that requires more investigation to harness its relevance with everchanging technology development. It explains that more research in the field of techno-ethics is needed to manage the growing application of technologies in diverse domains. The research on technology ethics is new and promising but divided into different domains and technologies. The limited intellectual exchange and lack of publications illustrate the fragmented knowledge on the understanding of this subject.

The analysis and visualization of the bibliometric database indicated that techno-ethics has continued to be an emerging research area in the last three decades. The concept of techno-ethics was introduced in the mid-1970s, and even then, the research in the domain keeps evolving with the growing technological development and its components. Naturally, techno-ethics is limited to computer science and engineering field. However, the data revealed substantial growth in the field of techno-ethics in humanities, social science, and management domain in the last two decades. This signifies that researchers engaged in multidisciplinary research should be sought as collaborators to enlarge the knowledge base of techno-ethics. Prominent cited references and documents in the database tend to cover the theme of AI, Big data, computer ethics, morality, decision-making, IT ethics, human rights, responsibility, and privacy. The findings are in agreement with the previous studies by Asemi and Ko (2020), C

Yallop and Aliasghar (2020), Liu *et al.* (2020) and Wójcik (2020) who advocated that embracing new technologies is challenging, but organisations should ensure appropriate legal and ethical grounds to safeguard the data and information. The analysis shows that one notable common theme associated with techno-ethics involves applied forms of ethics rather than philosophical, ethical inquiry. This indicates the shifting paradigm in the evolution of techno-ethics from normative to applied ethics.

Objective 1

The main research question of the study was as follows: What is an understanding about the concept "techno-ethics"? This study aims to utilise the themes and suggestions from the focus group with subject matter experts and from the past literature to develop an understanding related to techno-ethics.

Reliability and validity testing

Qualitative research is immersed in researcher's subjectivity of a context; therefore, it is necessary to firmly demonstrate the scientific nature of the subject without losing sight of its true essence (Hayashi Jr et al., 2019; Rose & Johnson, 2020). Notably, just like quantitative research employ number of methods and techniques to measure the ability of the instrument, the qualitative research also uses different approaches to establish the reliability and validity of the concepts. In qualitative research, reliability and validity criteria are measured and accessed on certain dimensions: credibility, transferability, confirmability, dependability, generality, and integrity (Golafshani, 2003; Guba & Lincoln, 1994; Patton, 2014; Rezapour Nasrabad, 2018). The dependability and confirmability dimensions reflect reliability (consistency and stability of findings) of the research study. To establish the reliability, all the authors were actively involved in inspecting and documentation of the transcripts. The themes and codes emerged from the independent analysis by the researchers were checked for consistencies. The created codes and themes were cross-checked on a single knowledgeable coder with a high level of agreement among researchers, thereby determining the inter-rater reliability of the findings (Day, 2022; Nowell et al., 2017). There was 78% agreement between the coders on 92% of the codes. Similarly, validity in qualitative research is ensured through credibility and transferability. Credibility (results represents the data) was established using member-check technique wherein some research participants received the findings and asked whether the results represent the actual interpretation of the comments they made. This enable researchers to verify "their findings, interpretations, and explanations" (Davis & Lachlan, 2017, p. 179), thereby increasing the trustworthiness of the data. Transferability refers to extent

to which findings and results of the research study can be generalize or applied to other similar contexts. As the qualitative research uses a small sample as compared to quantitative research, the issue of generalization exists. The researchers of the current study clarified all the procedure in detail to elicit the participants to think about the other contexts as well for a better understanding of the phenomenon (Tümen Akyıldız, 2020).

View on Techno-ethics

The identified five themes on the understanding of interaction between technology and ethics, and ten sub-themes related to antecedents and factors shaping techno-ethical orientation are displayed below in Table 11. The following themes were *Ethical aspect, Societal benefit, Security, Technology aspect, Growth aspect.* The corresponding sub-themes were *Blurred ethical boundaries, Development of new ethical dimensions, Pleasure principle, Enhanced engagement with community, Risk of being tracked, Lack of trust, No standard technology, Complexity yet flexibility, Promote business opportunities, Upskilling.*

Ethical aspect

Respondents explained that there is a need to conceptualize techno-ethics because technology has no standard ethical guidelines. The ethical boundaries are often neglected or ignored by the users while using technology. Moreover, most of the respondents observed that these days, technology is merely used for pleasure and fun. The actual and optimum utilisation of technology is either misunderstood or users lack awareness to make better utilisation of technology. Others declared that technology has re-define the ethical dimensions and it has led to development of new ethical boundaries such as data privacy, justice, fairness, honesty and integrity.

Societal benefit

Participants argued that with the advancement of technology, they are enabled to contribute in the community for the betterment of the society. They stated that one dimension of techno-ethics encompasses finding solutions to the societal issues in light of ethical principles. Ultimately, technology should serve the society and technology developers should be able to design and develop technologies that aid in solving the problems and issues of the society. As technology has become an integral part of the life, therefore, the society which guides the operation and functioning of it should be benefitted with its use. Respondents further added that majority of the people still find it inconvenient to work on technologies due to lack of digital literacy, awareness, and digital education. The excerpts from the focus group discussions are as follows:

I appreciate the support that technologies provide for senior citizens, physically challenged and less privileged strata of the society…….Technology has provided immense devices and tools for making their life adaptive to the normal setup

My grandparents in late 70s started using WhatsApp, YouTube, and Google voice assistant at such a late age…they are successfully utilising the technology for their health check-ups, diet plans, yoga classes and for translation…..It is so easy for them to get everything they need using Google voice assistant…

Security

The opinion of participants during the focus group discussion as follows:

Developers should do a thorough check related to the probable risk or ethical problems associated with the use of technology….. let's say drones are introduced but how can I ensure that it doesn't hinder the privacy of the other people or it is not harmful for the security and surveillance of a country..

The integration of ethics in technology is important considering the growing concerns of the tracking and lack of trust. After COVID-19, many tracing apps and health tracking apps were developed but there are doubts about the use of such applications. Participants noted that at one end, government is imposing the mandatory installation of such apps but the ethical use of users data is questionable. Applications ask for extracting data from contacts, photos, and other apps for enhancing the experience of users and leave no other option for users to accept the terms and conditions. Experts of the study highlighted the need of embedding ethics in technology as *tampering and fabricating the information is a common practice and it is just a one-click away to create wars and violence*. Ethical principles can provide answers and directions to deal with cybercrimes and combating unethical practices.

Technology aspect

The members of the focus group emphasized the rapid development of technology. Newer technologies are emerging in every 2-3 years catering to the needs of the society. Accordingly, the taste of users are getting updated and the ethical standards to evaluate the performance of technology are non-existent. The human values are merged with the technology values. The members also drew attention towards flexibility enjoyed by the users but they are also finding technologies complex. Often technology developers clubbed the technology with other services such as Gmail contains google drive, google meet, google chat, google photos, google classroom, etc. This creates confusion and users end up installing multiple apps for a

single purpose. An example of experience shared by the participant during focus group discussion is as follows:

My organisation insists working on telegram or organisation developed software for internal meeting whereas my daughter's school and teachers communicates through WhatsApp and school app…..now I have so many apps installed in the phone and almost 4-5 apps remain idle after single use…..this thought keeps on levitating that once I installed an app it takes away so many information and data from my phone as well…

Growth aspect

The employees and professionals of the organisation accentuate the advantages of technology adoption at the workplace. From the perspective of business, employers and owners are gaining substantial benefits for promoting business in different regions, areas, customers, and products. In addition, younger generation indicated the extent of technology in upskilling their education and career. Institutes and organisations have recognized the e-learning and online education prospects.

Table 11: Overview of themes and sub-themes illustrated with quotes from the focus group

Themes	Sub-themes	Illustrative quotes
Ethical aspect	Blurred ethical boundaries	*"With technology, what constitutes ethical or unethical is unclear"* *"From the perspective of one cohort, something seems ethical but for the other cohort, it doesn't work out in same manner"*
	Development of new ethical dimensions	*"For Gen Z, virtual classes and online courses is a new normal but for their early generations, books and traditional mode classes seems engaging and enriching"* *"I prefer in-person interactions but due to technology I have to be online almost whole day. Even employees find it appropriate to contact me late at night and I do conduct meetings with foreign clients late nights"*
	Pleasure principle	*"Most of the technology is used for pleasure seeking activities"* *"Even during covid-19, we enjoyed not attending the boring meetings by simply closing our cameras and mute button. Moreover, my exposure with technology has arisen almost 3 times in last 2-3 years as I find a break using social media apps. I find it ethical to use the phone during office hours as it provides a break from hectic work load"*

Societal benefit	Enhanced engagement with community	*"Undoubtedly, after adoption of technology I have found numerous ways to interact with society at large. I was able to engage with NGOs and do social works which otherwise I wasn't able to manage"* *"I found a new platform to interact and engage with others from similar background for work and life related issues. I found it motivating and inspiring as I seek advices from those who are facing similar issues"*
Security	Risk of being tracked	*"Though I have adopted technology too late in my life owning to the mandatory requirement at the organisation, however, I always feel confused and doubt the integrity of using technology. May be due to less knowledge, I'm unable to comprehend what will a particular option lead to if I mistakenly press it"* *"My daughter is teaching me how and what about the security of technology and she educates me about the cybercrimes happening on WhatsApp, Facebook and other platforms"* *"Being a marketing officer, I have to on field all of the time and company has made it mandatory to keep the GPS and their tracking app open during the work. I feel them knowing about my whereabouts is restricting my working"*
	Lack of trust	*"Yes, I don't easily trust the source of information shared through technology. As tampering and fabricating the information is a common practice and it is just a one-click away to create wars and violence"*
Technology aspect	No standard technology	*"The interaction of technology and ethics is not static; it will keep on changing and reanalysis is required every time a new technology is introduced"* *"Today, I enjoy being using Instagram but may be tomorrow or in next 4-5 years new technology will take over the current technology. So similarly, our ethics and value system will require a revisit. Maybe I won't be on same line with my children after 7-8 years down the lane"*
	Complexity yet flexibility	*"Initially, I find it too complex to use technology and prefer my traditional way of working but the younger employees used to tell me about the easy ways to technology use. Now, I keep my calendar updated, learnt using drive and cloud-based applications, my health is monitored by technology, my bills, appointments and other event information are easily manageable. Yet I feel*

		that I have made my life too complex as I have to be dependent on technology to recall a single thing"
Growth aspect	Promote business opportunities	*"My company achieved a significant profit and earned better position in the market since they have shifted to technology implementation. Reaching the unapproachable seems possible for a company thereby, giving immense benefits to an organisation to grow in every business"*
	Upskilling	*"Along with studies, I have completed almost 4 short courses and earned an additional plus in my resume"* *"I was able to collaborate with foreign researchers for my research and the collaboration leads to fruitful outcomes"*

Source: Primary Data

Participants explained and covered multi-dimensionality of techno-ethics from individual, organisational and societal perspective. Participants mentioned their experience with technology for education, business growth, community development, self, and country. The findings of the study emphasized on the need to revisit ethical protocols and principles for evaluating the ethical performance of technology. The concerns emerged from the discussions are in the agreement with the findings of previous studies by Abu-Shaqra (2020), Arevian et al. (2018), Autio (2017), Baltzan et al. (2015), Cartier et al. (2020), Finn & Donovan (2016), Luppicini & So (2016), Ogbujah et al. (2021). Similar research in the past postulated the techno-ethical view of advanced technologies and ICT devices. The use of technology and internet such as drones, AI, big data, social media, business driven technologies and devices, etc., has drew the attention of scholars to align ethics in technology use. The results highlighted the application of ethics in technologies used for education, business growth, and society development.

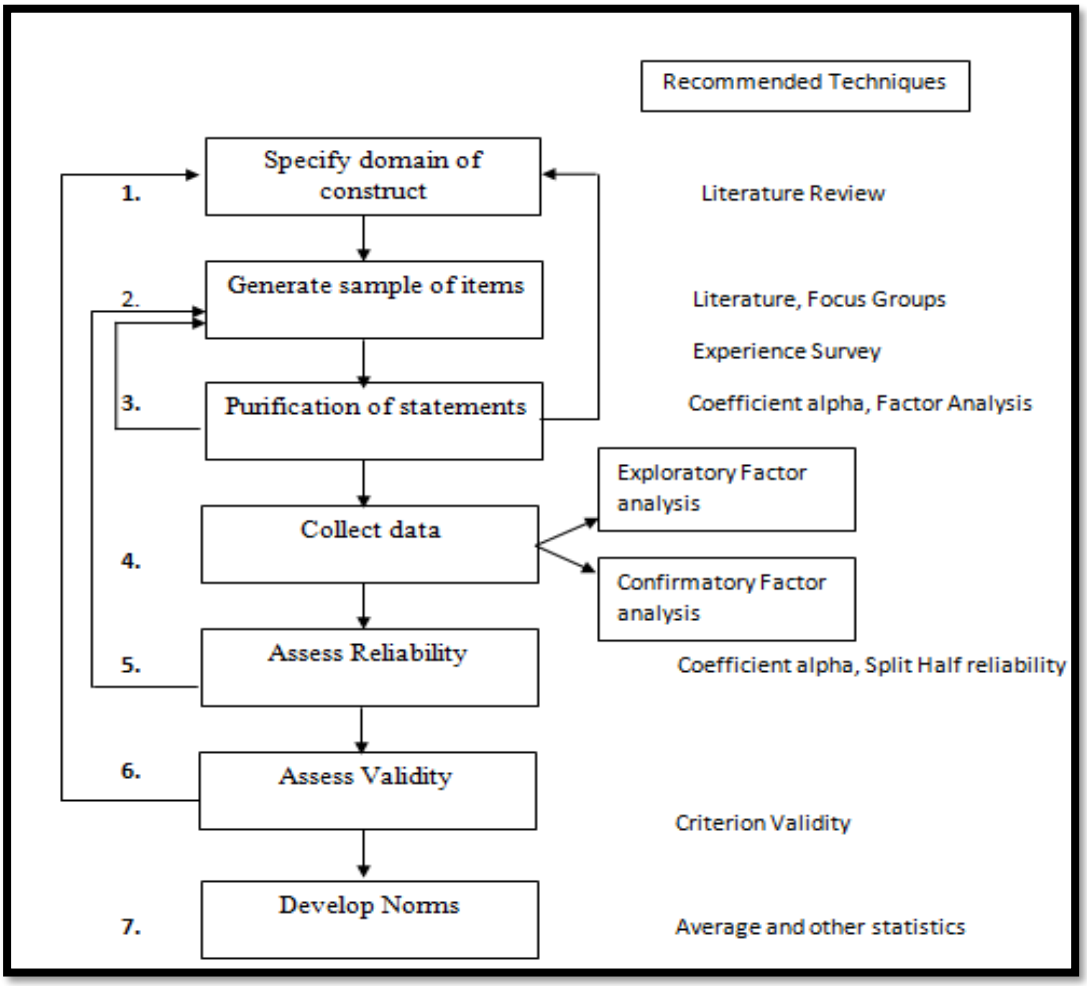
Objective 2

Churchill (1979) provided a few steps and rules for scale development. Based on the same principles, the methodology for constructing a questionnaire is as follows (adapted from Latif, 2018):

1. Specification of Domain of the Construct
2. Generation and Classification of items through experience survey
3. Initial Data Collection and Purification of Measure through a pilot study and expert reviews
4. Data Collection

5. Exploratory Factor Analysis
6. Confirmatory Factor Analysis

Figure 9: Steps for the development of better measures



Source: Churchill, 1979

The first and foremost step in scale development is the identification of a construct. This step requires specifying the construct under study because otherwise, the concept definition will be inadequate for identifying how to measure the construct. Accordingly, researcher of the study defined techno-ethical orientation as "relational orientation to technology and human activity concerned with all ethical aspects of technology within a society shaped by technology" (adapted from Luppicini, 2009b). For generation and classification of items, an experience survey method to gauge the understanding of which items to be included or excluded from the questionnaire was employed. The experience survey was distributed to the employees of educational institutions and two professional organisations for their opinion, beliefs, and feelings about the usage of technology by various generations and how technology has shaped the ethical orientation. The sample items of the experience survey were: "Please

indicate the extent to which you experience that technology has taken over the control of your life" (on a scale of 1=strongly agree, to 5= strongly disagree); and "Technology seems user-friendly to me." Based on this survey, 27 statements were formulated that try to capture the techno-ethical orientation of the individuals.

These 27 statements were subjected to a pilot study on a small sample of 33 respondents. Afterward, an expert committee consisting of research scholars working in the field of ethics, human-technology interaction, corporate social responsibility, and academicians from 3 colleges were presented with the draft questionnaire. Based on extensive discussions of the panel, seven statements that appeared irrelevant were omitted. After modifications, the final questionnaire consisted of 20 statements. Now, data was collected using this twenty-items modified questionnaire. The sample items of the questionnaire were "Sharing confidential information with others on social media" and "Using instant messaging apps during work hours," rated on a five-point rating scale ranging from 1 (most unethical) to 5 (most ethical).

As the data is collected from multiple sources, therefore it is important to reduce the common method biases. In line with the steps provided by the Podsakoff, MacKenzie, Lee, & Podsakoff (2003) to avoid the common method biases, respondents were instructed to provide authentic answers which they believe is true in their case (not socially desirable) and they were ensured that their answers will be kept confidential and will not be shared with anyone.

Exploratory Factor analysis (EFA) was performed on the sample using principal component analysis and varimax rotation using IBM SPSS 25 to discount the variables and achieve correlated variables that will provide an essence of the pattern being followed by the participants. The sample was randomly split into two sets. Set 1 (170 cases) was used for developing the constructs and Set 2 (132 cases) was used as a holdout sample to validate the results from Set 1.

Exploratory factor analysis

Exploratory Factor Analysis is a statistical multivariate technique used to reduce the number of variables, examine the relationship between variables, and aggregate variables that correlate constructs into the extent of commonality (Beavers et al., 2013). As the name suggests, this technique is exploratory in nature and allows the researcher to "generate a theory or model from a relatively large set of latent constructs" (Hogarty et al., 2005; Thompson, 2004; Williams et al., 2010).

For assessing the suitability of the information provided by respondents, several tests were used which include Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and

Bartlett's Test of Sphericity. The suitable range of KMO for factor analysis is from 0 to 1 and for Bartlett's Test it is should be significant with p<.05 (Joseph F. Hair, Anderson, et al., 2010; Tabachnick & Fidell, 2007). KMO and Bartlett's Test of Sphericity for all the groups in this study to be greater than 0.6 and significant at p<0.05 respectively which indicates that data is suitable for the application of factor analysis (Kaiser, 1970). Finally, 20 statements were subjected to factor analysis using principal component analysis. Application of principal component analysis is recommended because of its use when no prior theory or model exists (Gorsuch, 1997). Moreover, Varimax rotation was applied because it makes interpretable clusters by maximizing the dispersion of loadings (Field, 2009) and provides consistent utility.

The factor analysis yielded four latent variables (see table 12). The four factors have a cumulative value of 58.646% percent in explaining the total variance in the data. And these factors are explained as follows:

F1: Infringement of the right of Privacy - This involves statements that encompass creating hindrance in the matter of confidential information and also interference into other's privacy. Eight statements such as "Reading and forwarding emails of others without their consent," "sending files with virus intentionally," and "Not giving due credits to someone for providing assignment related material." The factor could explain 30.161% variance.

F2: Self –Enrichment- Statements that deal with the use of an organisation's material for personal benefits or gains were covered under this factor, with 11.962% of the variance. Examples such as making a personal copy of a rented movie, copy software from the organisation for personal use, and using workplace organisation for playing games online.

F3: Defamation- Statements that are intended to harm someone by criticizing them on internet were covered under this factor and explain 9.207% of the total variance. It involves labeling the organisation or workplace.

F4: Loafing during work hours- This factor comprises of 4 statements and constitutes 7.317% of the total variance in the EFA analysis. Loafing, i.e., using instant messaging apps during work hours, is evident in this factor extraction. It involves having fun during office work instead of doing productive work.

Table 12: Results of Factor Analysis

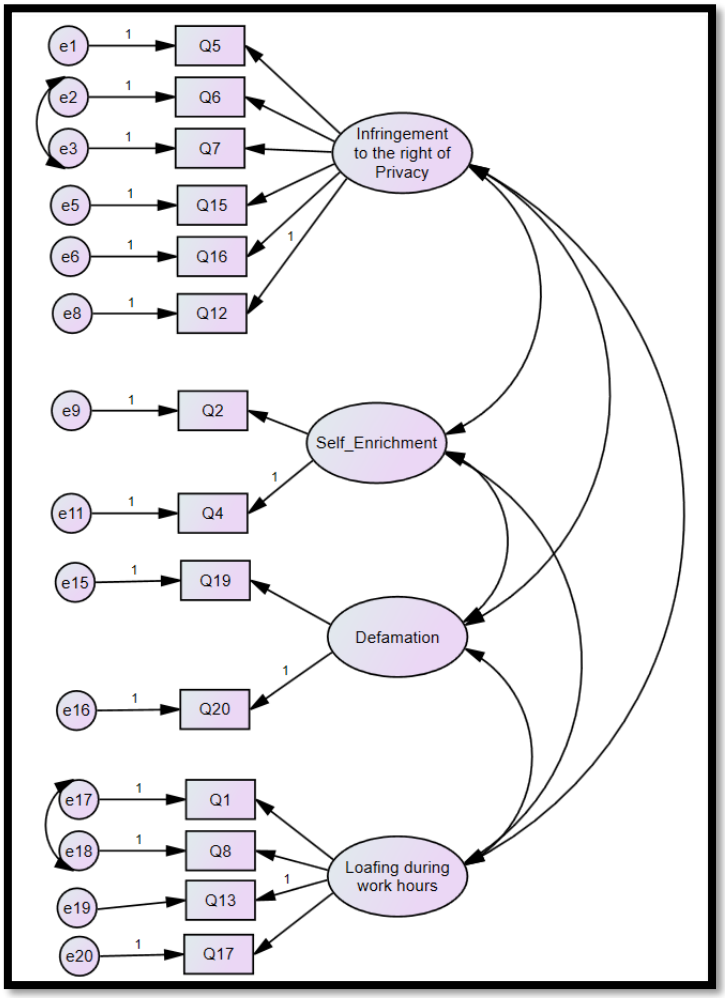
Factors	Eigen Values	% of variance
F 1- Infringement of the right of privacy	6.032	30.161
F 2- Self- Enrichment	2.392	11.962
F 3- Defamation	1.841	9.207
F 4-Loafing during work hours	1.463	7.317

Source: Primary Data

Confirmatory Factor Analysis

Confirmatory Factor Analysis (CFA) helps in examining the link between observed and latent variables based on the underlying theoretical constructs (Hair, Black, Babin, and Anderson, 2014). Latent constructs are drawn as ellipses and measured variables are represented by rectangles. The relationships between the latent constructs and the respective measured variables (called factor loadings, as in EFA) are represented by arrows from the construct to the measured variable. Finally, each measured indicator variable has an error term (shown as an e in Figure 10), which is the extent to which the latent factor does not explain the measured variable. The curved arrows between the two constructs denotes a correlational relationship between them . Statistics associated with the default model were discouraging and indicated poor model fit. Value of χ^2 (χ^2= 734.816) and other indexes such Goodness of fit index (GFI), p-close, and root mean square error of approximation (RMSEA)showed that the default model does not fit well as the values of these parameters are not in line with the cut off values (Hu and Bentler, 1999; Schumacker, R. E., and Lomax, 2004). Now, this model must require certain modifications. The following steps are followed for model modifications (Harrington, 2009; Simon et al., 2010): a) Check the regression loadings of observed variables on unobserved variables, b) Look out for modification indices (MI), and c) Examine the standardized residual covariance. Based on the modification steps mentioned above, final model highlights RMSEA came out as 0.098, CMIN/df= 3.839, GFI has a value of 0.895, TLI= 0.790, CFI=0.841 and p close is 0.000. Now, all values show a good model fit except TLI, p-close, RMSEA. Figure 10 depicts a well fitted theoretical model for measuring techno-ethical orientation in the Indian context. And this scale comprises of 14 statements now. After confirmatory factor analysis, reliability and validity testing was done.

Figure 10: Final CFA Model



Source: Primary Data

Reliability and validity testing

The reliability of the scale was accessed using composite reliability estimates, whose values should be greater than 0.7 to support good reliability (Hair, Black, Babin, and Anderson, 2010). Table 13 reports that all four dimensions of technology-oriented ethical behavior are reliable. Now, convergent validity is calculated with the help of Average Variance Extracted (AVE). As a rule of thumb, Average Variance Extracted (AVE) of .5 or higher was good and indicated an adequate level of convergent validity (Fornell and Larcker, 1981). Table 13 reported AVE values of all four extracted factors. Also, the AVE values (highlighted in bold and placed diagonally in table 14) are greater than the squared inter-correlation of the constructs. It confirms the discriminant validity of the scale (Fornell and Larcker, 1981).

Table 13: CR and AVE for each factor

Factor	Composite Reliability	AVE
Infringement of the right of privacy	0.720	0.554
Self-enrichment	0.760	0.615
Defamation	0.765	0.620
Loafing during work hours	0.709	0.584

Source: Primary Data

Table 14: Discriminant Validity of extracted factors

Factors	Factor 1	Factor 2	Factor 3	Factor 4
Infringement of the right of privacy	**0.554**			
Self-enrichment	0.064	**0.615**		
Defamation	0.150	0.087	**0.620**	
Loafing during work hours	0.084	0.028	0.046	**0.584**

Source: Primary Data

Objective 3

Intergenerational differences in technology-oriented ethical behavior

Table 15 and table 16 describe intergenerational variations of four factors of the technology-oriented ethical behavior of pre-millennials, millennials, and post-millennials. Table 16 reports statistically significant variations in four factors of technology-oriented ethical behavior among pre-millennials, millennials, and post-millennials (all p value< .05). Table 15 observes that, except for self-enrichment, mean values progressively increase from pre-millennials to post-millennials. Even for the self-enrichment factor, the mean value (mean=2.97) is maximum for post-millennials. Figure 11a to 11d graphically depicts the same. It indicates that younger generations are relatively more open to infringement of the right to privacy, self-enrichment, defamation, and loafing during office hours. The younger generation considers these actions as more ethical than their previous generations. In lieu of these findings, online communications, technology and internet at the workplace has spearheaded the changing pattern of technology usage by all generations. Unethical and unapproved practices on the internet through the organisation's channel has given rise to cybercrimes. Online defamation is the most dangerous form of practices because of its ability to disguise identities of employees and organisation (Bhatnagar, 2013). Defamation has the potential to deter the status, goodwill, and social image. Therefore, this urges for reshaping of organisational policies in view of identified factors. These factors are pivotal areas in placing ethical principles at use while using technology.

Table 15: Descriptive statistics for each factor according to generations

Factors	Cohort	N	Mean	S. D
Infringement of the Right of Privacy	Pre-Millennial	58	1.39	0.452
	Millennial	111	1.54	0.429
	Post-Millennial	133	1.88	0.741
Self-enrichment	Pre-Millennial	58	2.32	0.814
	Millennial	111	2.11	0.991
	Post-Millennial	133	2.97	0.923
Defamation	Pre-Millennial	58	1.90	0.827
	Millennial	111	1.91	0.649
	Post-Millennial	133	2.26	1.121
Loafing during work hours	Pre-Millennial	58	1.82	0.614
	Millennial	111	2.26	0.616
	Post-Millennial	133	2.32	0.633

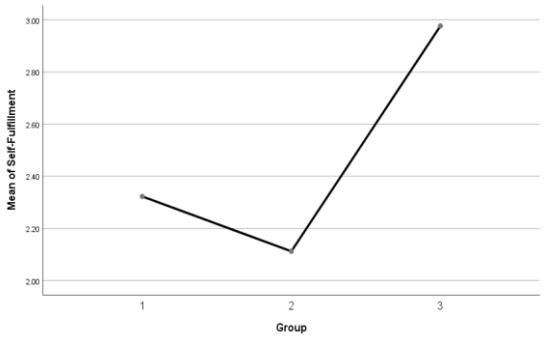
Source: Primary Data

Table 16: Results of One-way ANOVA

Factors		SS	Df	MS	F	Sig.
Infringement of the right of privacy	Between Groups	14.7	2	7.355	21.07	.000*
	Within Groups	104.2	298	0.349		
	Total	119.0	300			
Self-enrichment	Between Groups	40.5	2	20.29	25.29	.000*
	Within Groups	239.2	298	0.802		
	Total	279.8	300			
Defamation	Between Groups	9.15	2	4.577	5.201	.006*
	Within Groups	262.3	298	0.880		
	Total	271.4	300			
Loafing during work hours	Between Groups	16.2	2	8.116	21.080	.000*
	Within Groups	115.0	298	0.385		
	Total	131.2	300			

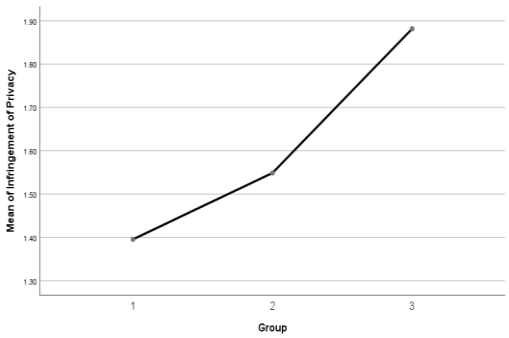
*Source: Primary Data, *Sig at 05, SS- Sum of Squares, MS- Mean Square, Df- Degree of freedom*

Figure 11a: Means Plot for "Infringement of the right of privacy"



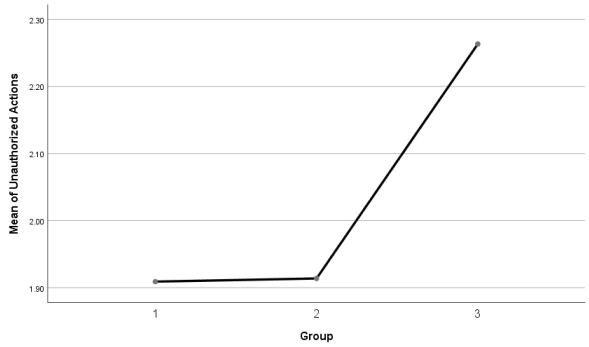
Source: Primary Data

Figure 11b: Means Plot for "Self-enrichment"



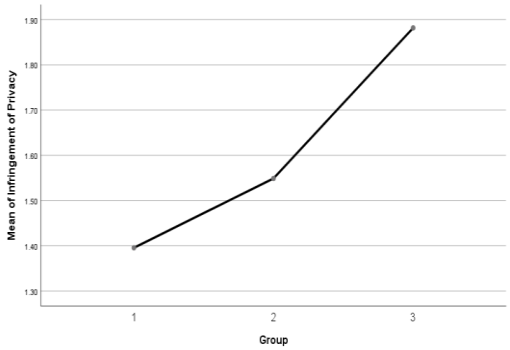
Source: Primary Data

Figure 11c: Means Plot for "Defamation"



Source: Primary Data

Figure 11d: Means Plot for "Loafing during work hours."



Source: Primary Data

Surprisingly, a great deal of available literature on generational differences in ethical orientation has been based on the cohort's ideology, their ethical approach, leadership styles and its implications in different cultural context separately (Bucic, Harris, and Arli, 2012; Eweje and Brunton, 2010). Instead of providing a holistic comparative study of different generations in a particular culture setup. This study provides empirical evidence concerning the use of technology in the workplace and then try to explore intergenerational technology-oriented behavior. The research has made an incremental contribution to the body of knowledge surrounding techno-ethics. The present study offers two major findings. Firstly, the study provides four factors in the context of the use of technology in the workplace. These factors are "Infringement of the right of privacy," "Self-enrichment," "Defamation," and "Loafing during work hours." Secondly, the result highlights significantly different technology-oriented behavior among generations X, Y, and Z. The findings state that younger generations consider these traditional organisational taboos more ethical than their previous generations. It indicates a shift towards acceptance and tolerance of more liberal techno-ethical

policies. For inference, loafing at the workplace is generally seen as unethical by the HR manager and management. But post-millennials perceive such workplace behavior as more ethical than millennial and pre-millennial. These findings are in alignment with the concept of "weisure" time, where work and leisure are one and the same (Meister & Willyerd, 2010). This indicating that for digital generations, the division between labour and leisure will increasingly blur in the quest for a work-life balance (Okros, 2020). This shifting ethical paradigm possess a new challenge for modern-day HR managers. They need to bring about necessary and desirable changes in organisational ethical philosophy and policies to accommodate the new ethical positioning of a new generation of employees. Although more research is required, there is a clear trend towards new normal techno-ethics in the workplace. The new normal paradigm of techno-ethics necessitates more liberal and generous ethical policies towards the use of technology at the office. The survival of organisation requires reshaping and redefining its policies and strategies accordingly. Having said that and considering emergence of techno ethics, authors recommend changes in both organisational culture and activities to accommodate changing attitude and behavior of upcoming new generation workforce. Along with it, sufficient training and education in terms of awareness about norms and ethical code of conduct in the organisation to millennials and post-millennials is necessary before entering the organisation.

The findings are also in line with the generational difference in emotional reactions to emerging technologies. Pre-millennials expect simple interfaces for technology use and experience anxiety while using Internet-enabled devices (Czaja, 2006; Rosenthal, 2008; Shedletsky, 2006), whereas the Generation X population likes sophisticated devices because of their exposure and adaptability with the internet and internet-enabled modern devices.

Objective 4

Reliability and validity testing

The reliability of techno-ethical orientation, ethical decision-making, and different dimensions of the technological framework was measured with the help of Cronbach's alpha and CR values. The α and CR estimates (as indicated in Table 17) were greater than 0.70, which established the reliability of the study variables (Joseph F. Hair, Anderson, et al., 2010; Henseler et al., 2009). In addition, the AVE values of all constructs were higher than the recommended threshold of 0.50, which concluded the convergent validity of the scale (Fornell & Larcker, 1981). The discriminant validity was tested for all the five components of the moderator "Technological Frames" using Fornell and Larcker's (1981) criteria. The square root

of AVE values (highlighted in bold and placed diagonally in Table 18) are higher than its correlation with other constructs. It confirms the discriminant validity of the scale.

Table 17- Descriptive Statistics

Construct	Mean	Std. Deviation	α	CR	AVE
Techno-ethical orientation	2.93	1.82	0.917	0.955	0.687
Ethical decision-making	3.38	0.55	0.899	0.921	0.655
Personal Attitude	5.83	0.99	0.885	0.842	0.572
Application Value	5.71	0.91	0.894	0.858	0.595
Organisational Influence	4.25	1.48	0.929	0.894	0.631
Supervisor Influence	5.10	1.13	0.869	0.775	0.655
Industry Influence	5.16	1.27	0.939	0.899	0.607

Source: Primary Data; α- Cronbach's alpha, CR- Composite Reliability, AVE- Average Variance Extracted

Table 18-Measure of Discriminant Validity

Construct	1	2	3	4	5
Personal Attitude	**0.756**				
Application Value	0.743	**0.771**			
Organisational Influence	0.289	0.432	**0.794**		
Supervisor Influence	0.442	0.408	0.669	**0.809**	
Industry Influence	0.515	0.493	0.555	0.678	**0.779**

Source: Primary Data; Square root of AVE values in diagonal and highlighted in bold

Analysis

Structural equation modeling (SEM) was used to test the theoretical model and hypothesis proposed in this study. SEM is considered a large sample method (minimum sample size of 200) that offers flexibility and generality to evaluate any theoretical model (Hayes, 2017; Hayes et al., 2017). The use of SEM for the present study is considered appropriate given the sample size and the measurement model proposed for research. IBM SPSS AMOS (Analysis of Moment Structure) software accurately reflects complex relationships in attitudinal and behavioral models through various multivariate analysis methods (IBM, 2016). Since the present study requires testing and confirming existing theoretical models, covariance-based- SEM (CB-SEM) is considered an appropriate method than PLS-SEM. Moreover, Amos is more stringent than Smart PLS (Joe F Hair et al., 2017). One of the advantages of CB-SEM over PLS-SEM is the tendency of the PLS to cause overestimation of the measurement parameters and the underestimation of the structural parameters (Al Issa & Abdelsalam, 2021). For the current study, the AMOS standard estimation model, i.e., maximum likelihood estimation (MLE), was employed. The basic assumptions for running MLE, such as large sample size, multivariate normal distribution, and validity of the hypothesised model, were fulfilled. For normality check, Tabachnick and Fidell (2007) recommended the normal range for skewness-kurtosis value. When the skewness-kurtosis statistic is divided by its standard error and the value is greater than $z = \pm 3.29$ ($p < 0.001$, two-tailed test), it raises normality

concerns. However, all the items in the dataset were found to be normally distributed (i.e., less than z= ± 3.29). More specifically, the skewness and kurtosis value in each case was less than ±1, indicating normality in the dataset of this study. Hair *et al.* (2010) recommended the existence of multicollinearity if the inter-correlation amongst the constructs was more than 0.90. The inter-correlation amongst the constructs for this study ranged from 0.289 to 0.753; thereby, no evident issue of multicollinearity was found.

Table 17 and 18 illustrates descriptive statistics, reliability, and validity estimates of study variables. The relationship between techno-ethical orientation and ethical decision-making was analysed using correlation and regression. Tables 19 and 20 demonstrate correlation and regression values between techno-ethical orientation and ethical decision-making. The correlation coefficient between independent and dependent variables was 0.513 (Table 19). Also, as indicated in table 20, the regression coefficient (β= 0.213) was reported significant at 0.05, which provides empirical support for the acceptance of the first hypothesis. R-square values showed a 45.2% variation in ethical decision-making is explained by techno-ethical orientation. It suggests that the techno-ethical orientation is positively associated with ethical decision-making. The moderation effects of the five dimensions of technological frames were analysed through SEM in AMOS v25.0. Accordingly, a moderation model was developed. The proposed measurement and structural model factors showed good model fit indices with accepted threshold limits recommended by Hair *et al.* (2007). The results of the confirmatory factor analysis (CFA) are presented in Table 21.

Table 19- Correlation among variables

Variables	1	2	3	4	5	6	7
TEO	1						
PA	0.423	1					
AV	0.381	0.753*	1				
OI	0.327	0.289	0.432*	1			
SI	0.431	0.442*	0.408*	0.669*	1		
II	0.362	0.515*	0.493*	0.555*	0.678*	1	
EDM	0.513*	0.303	0.464	0.387*	0.463	0.305	1

*Source: Primary Data, *Sig at 0.05, TEO- Techno-ethical orientation, PA- Personal attitude, AV- Application value, OI- Organisation influence, SI- Supervisor influence, II- Industry influence, EDM- Ethical decision-making*

Table 20-Summary of Regression results

IV	DV	Unstandardized co-efficient	Standard Error	Standardized Co-efficient	R-square	P-value
TE	EDM	0.342	0.236	0.213	0.452	0.015*

*Source: Primary Data, * Sig at 0.05, TE- Techno-ethical orientation, EDM- Ethical decision-making, IV- Independent Variable, DV- Dependent Variable*

Table 21- Model fitness indices

Fitness indices	Measurement model	Structural model	Cut-off criteria
CMIN/df	4.25	3.33	2-5
CFI	0.901	0.922	≥ 0.90
RMSEA	0.05	0.04	< 0.06
p-value	0.42	0.06	> 0.05
SRMR	0.057	0.070	< 0.08
TLI	0.952	0.956	≥ 0.95
GFI	0.955	0.958	≥ 0.95

Source: Primary data, CMIN/df- Chi-square/degree of freedom, CFI- Comparative fit index, RMSEA- Root mean square error of approximation, SRMR- Standardized root mean squared residuals, TLI- Tucker-Lewis index, GFI- Goodness-of-fit index

Moderation Analysis

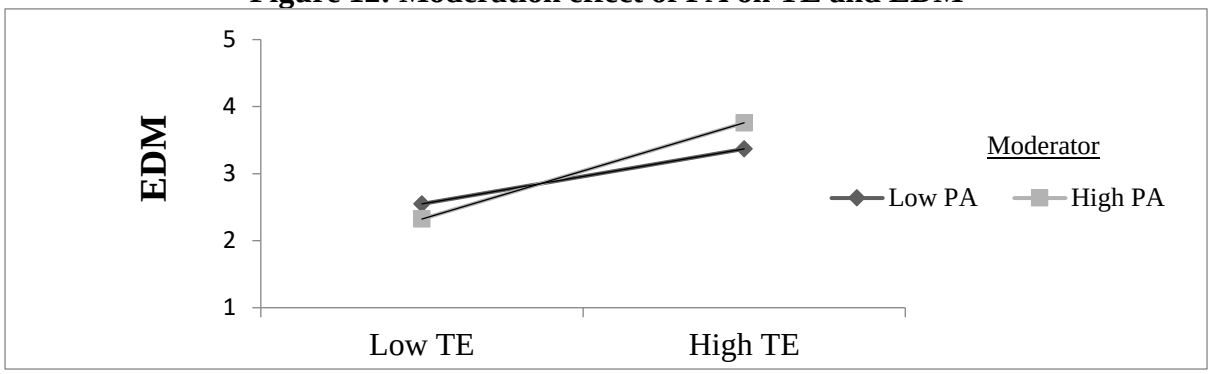
Tables 22-26 explain the interaction effect of moderators and the independent variable (techno-ethical orientation) on the dependent variable (ethical decision-making). The results indicate a positive relationship between techno-ethical orientation and ethical decision-making. And this relationship is strengthened in the presence of personal attitude (Table 22). Also, the moderating impact of personal attitude on the relationship between techno-ethical orientation and ethical decision-making style is significant (b=0.154, t= 2.42, p=0.015). Figure 12 stated that the line for High PA is much steeper, indicating that with a high personal attitude (positive attitude towards technologies), the impact of techno-ethical orientation on ethical decision-making style is much stronger than Low PA. As long as the attitude towards technologies is positive, the orientation and individual's decision-making style are more ethical. Thus, hypothesis H4 is supported.

Table 22- Moderation analysis summary for PA as moderator

Relationship	Beta	C.R	P-value
Techno-ethics⟶ Ethical decision-making	0.564	2.34	0.019*
Personal attitude ⟶ Ethical decision-making	0.041	0.08	0.935
Techno-ethics*Personal attitude ⟶ Ethical decision-making	0.154	2.42	0.015*

*Source: Primary Data, *Sig at 0.05*

Figure 12: Moderation effect of PA on TE and EDM



Source; Primary data

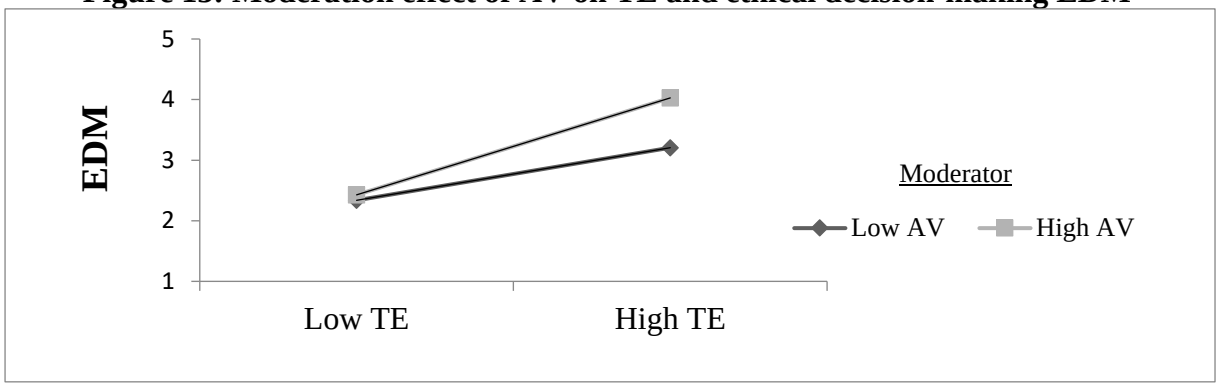
Similarly, the moderating impact of application value on the relationship between techno-ethical orientation and ethical decision-making is shown in Table 23. The results indicate a positive relationship between techno-ethical orientation and ethical decision-making. And this relationship is strengthened in the presence of application value (Table 23). Also, the moderating impact of application value on the relationship between techno-ethical orientation and ethical decision-making style is significant (b=0.183, t= 2.40, p=0.016). It can be stated that the line for High AV is steeper, indicating that at high application value (technology use is valuable), the impact of techno-ethical orientation on ethical decision-making style is much more substantial as compared to Low AV (Figure 13). As long as the technology provides valuable benefits in work, the orientation and decision-making style are more inclined toward ethical technology-related behavior. Surprisingly, the decision-making style and orientation were still ethically inclined at low AV. Thus, hypothesis H5 is supported.

Table 23- Moderation analysis summary for AV as moderator

Relationship	**Beta**	**C.R**	**P-value**
Techno-ethics⟶ Ethical decision-making	0.617	2.44	0.015*
Application value ⟶ Ethical decision-making	0.228	0.430	0.667
Techno-ethics*Application value⟶ Ethical decision-making	0.183	2.40	0.016*

*Source: Primary Data, *Sig at 0.05*

Figure 13: Moderation effect of AV on TE and ethical decision-making EDM



Source: Primary data

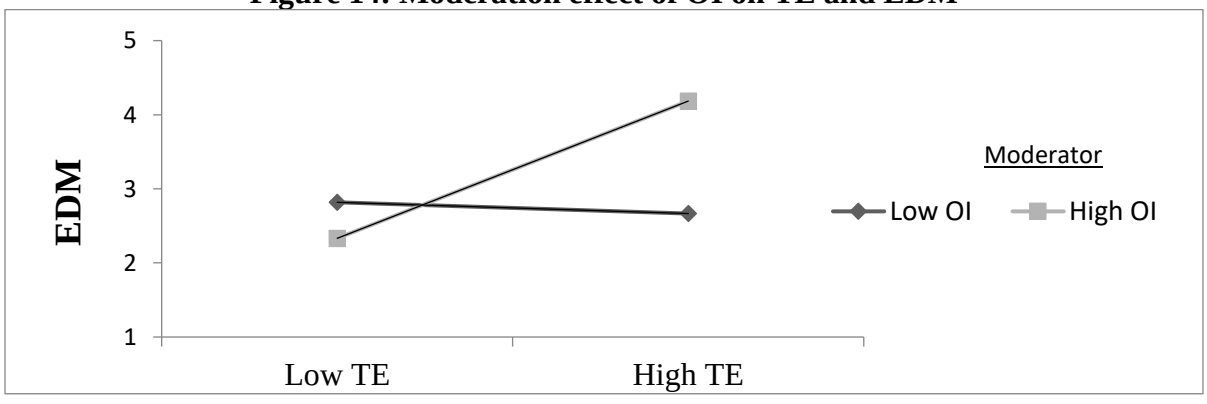
Apart from personal and technology-linked factors, the role of organisation support, supervisor support, and industry factors during technology usage were assessed (Table 24-26). At the organisational level, colleagues' and organisations' support while using technology reinforces the positive relationship between techno-ethical orientation and ethical decision-making (Table 24). In the presence of organisational factors such as help from colleagues in using technologies for the job, the relationship between DV and IV strengthens and becomes significant (b=0.501, t=1.853, p-value= 0.046). Therefore, managers' decision-making style depends on organisational factors (Figure 14). Thereby, hypothesis H6 is supported.

Table 24- Moderation analysis summary for OI as moderator

Relationship	Beta	C.R	P-value
Techno-ethics⟶ Ethical decision-making	0.425	1.735	0.083
Organisation influence ⟶Ethical decision-making	0.258	0.590	0.112
Techno-ethics*Organisation influence ⟶ Ethical decision-making	0.501	1.853	0.046*

*Source: Primary Data, *Sig at 0.05*

Figure 14: Moderation effect of OI on TE and EDM



Source: Primary data

The supervisor's support and willingness to integrate the technology with the firm has a significant and positive impact on influencing the relationship between a person's techno-ethical orientation and ethical decision-making (b=0.540, t= 0.916, p value= 0.030) (Table 25).

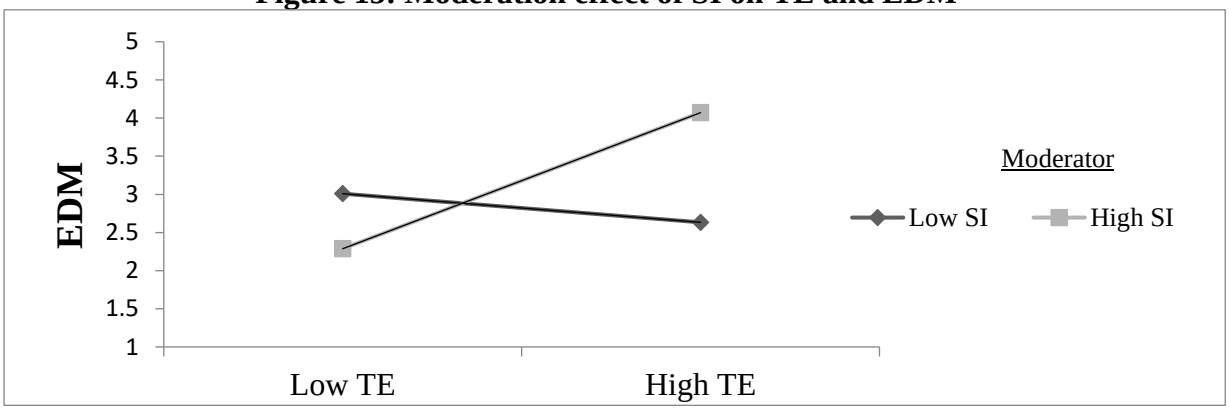
If the supervisor requests the use of technology and regularly supports its implementation, the orientation and decisions related to technology will be more ethical. Higher the supervisor's support, highly ethical the orientation and decision-making style will be (Figure 15). Thereby, hypothesis H7 is supported.

Table 25- Moderation analysis summary for SI as moderator

Relationship	Beta	C.R	P-value
Techno-ethics⟶ Ethical decision-making	0.352	0.506	0.013*
Supervisor influence ⟶ Ethical decision-making	0.179	0.398	0.691
Techno-ethics*Supervisor influence ⟶ Ethical decision-making	0.540	0.916	0.030*

*Source: Primary Data, *Sig at 0.05*

Figure 15: Moderation effect of SI on TE and EDM



Source: Primary data

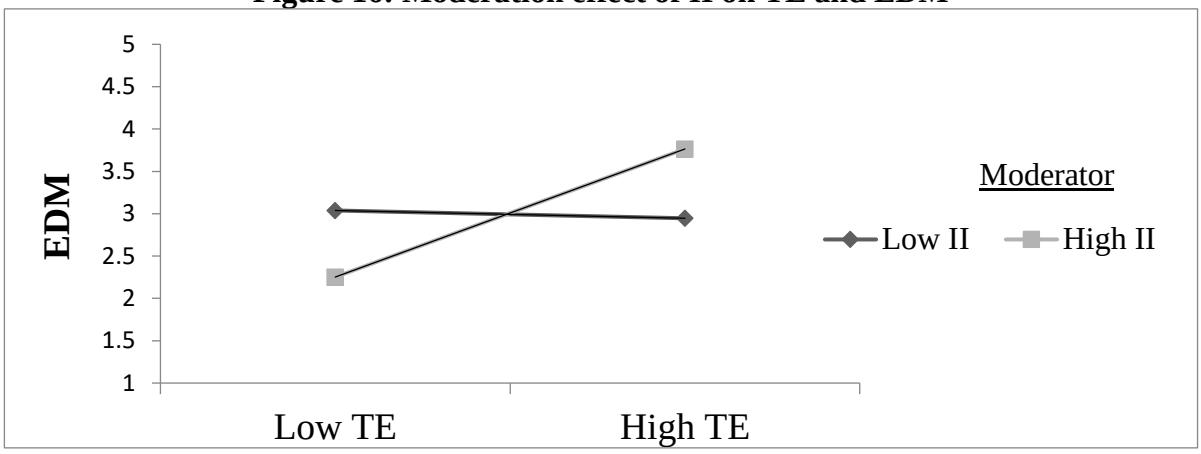
The data at the industry level were also analysed, and the results for the same are presented in Table 26. Industry factors such as demand from competitors to use the technologies have a significant and major influence on a person's techno-ethical orientation and ethical decision-making (b= 0.401, t= -0.568, p= 0.050). Industry factors strengthen the positive relationship between IV and DV, and this impact is noticeable (Figure 16). Hypothesis H8 is supported (positive and significant relationship).

Table 26- Moderation analysis summary for II as moderator

Relationship	Beta	C.R	P-value
Techno-ethics⟶ Ethical decision-making	0.355	-1.515	0.130
Industry influence ⟶ Ethical decision-making	0.008	0.020	0.934
Techno-ethics*Industry influence ⟶ Ethical decision-making	0.401	-0.568	0.050*

*Source: Primary Data, *Sig at 0.05*

Figure 16: Moderation effect of II on TE and EDM



Source: Primary data

Technology is the backbone for business organisations and global markets to systematically integrate their operations and connect with customers even in a complex and dynamic environment. With the emergence of the internet of things, big data, and cloud-based systems, industries have revolutionised their operations. Due to technological innovations and state-of-art infrastructure, the industries saw impressive growth in its operation and interaction (Björkdahl, 2020; K. P. Liu & Chiu, 2021). However, the COVID-19 outbreak has significantly affected domestic and global supply chain operations (Paul et al., 2021). The practitioners and decision-makers were not ready to manage the pandemic's severe impact, and organisations' performance was compromised (Paul et al., 2021). Despite these challenges, many industries recovered effectively with the help of high-tech and specialised technologies even post COVID-19 era. However, employees and staff struggle to adjust to new processes and tools due to a lack of training, practice, and knowledge about software, the internet, and ICT devices. Not everyone finds himself comfortable with new technologies. It leads to growing incidents of wrongful and unethical practices with technology. Given the potential and substantiate contribution of the businesses to a country's economic and financial growth, assessing an individual's techno-ethical orientation and its influence on ethical decision-making is imperative. To analyse this in detail, the present study focuses on evaluating the effect of an individual's techno-ethical orientation on ethical decision-making in the presence of technological frames.

The objective was to examine the relationship between the techno-ethical orientation of employees and the ethical decision-making process in the presence of various factors influencing the relationship. The research study examines the moderating role of technological frames (personal attitude, application value, organisational factors, supervisor influence, and

industry influence) on the proposed association between techno-ethical orientation and ethical decision-making. The proposed research model was established based on the extant literature. Six hypotheses were consequently confirmed. Drawing from the empirical results using SEM Amos, all six hypotheses were statistically supported and found to be significant. Techno-ethical orientation has a positive and significant influence on ethical decision-making.

Similarly, all variables of technological frames have positive and significant moderating effect on the relationship between techno-ethical orientation and ethical decision-making. The study results signify that having a positive attitude towards technology, valuable services offered by technology, support from organisations and supervisors, and increasing demand for technology usage at the industry level enables a decision-maker to utilise technology ethically and improves decision-making. The investment in digital tools, technology, and ethical decision-making will help in maintaining an ethical climate and culture.

OBJECTIVE 5

The results are presented in two sections. First, an association between the independent variable and dependent variable was established through regression analysis. Second, the moderating effect of digital citizenship between techno-ethical orientation and corporate ethical values was analysed and tested.

Descriptive statistics, reliability and validity testing

Table 27 highlights the results of the descriptive statistics, correlation analysis, reliability, and validity values. Results show that online respect has the highest mean of 4.18 among the constructs indicating that respondents were more likely to show online respect while using technology. The correlation among the independent, dependent, and moderators displayed moderate to high correlation values ranging from 0.593 to 0.752. The reliability measures- Cronbach's alpha (CA) and Composite reliability (CR) showed highly acceptable values ranging from 0.868 to 0.964, conforming to the adequate level of reliability (L. L. Chan & Idris, 2017; Peterson & Kim, 2013). The construct validity consisting of convergent and discriminant validity of all the constructs was analysed according to Fornell and Larcker's criteria using Average variance extracted (AVE). The values of AVE were sufficiently above the threshold value of 0.50 (Fornell and Larcker, 1989), thereby supporting the convergent validity of the model. Similarly, the square root of the AVE values (highlighted in bold and placed diagonally in Table 27) was greater than its correlation with other constructs. Thereby, discriminant validity was established.

Table 27: Descriptive analysis, correlation analysis, reliability and average variance extracted

Variables	Mean	SD	CA	CR	AVE	1	2	3	4
TE	2.89	0.594	0.894	0.964	0.666	**0.816**			
OR	4.18	0.788	0.902	0.905	0.581	0.696	**0.762**		
OCE	3.96	0.819	0.941	0.868	0.623	0.752*	0.729*	**0.789**	
CEV	3.20	0.742	0.910	0.910	0.670	0.670*	0.593*	0.737*	**0.819**

*Source: Primary Data, *Sig at 0.05, S.D- Standard Deviation, CA- Cronbach's alpha, CR- Composite reliability, AVE- Average variance extracted, TE- Techno-ethical orientation, OR- Online respect, OCE- Online civic engagement, CEV- Corporate ethical values, Values highlighted in bold and present in diagonals are the square root of AVE.*

Predicting corporate ethical values from techno-ethical orientation

The results from Table 28 indicate techno-ethical orientation to significantly predict corporate ethical values (β=0.295, t=3.71, p <0.05). R-square values showed a 24.1% variation in corporate ethical value was explained by techno-ethical orientation. It suggests that the techno-ethical orientation was positively associated with corporate ethical values. Thus, hypothesis H9 was supported. In this sense, techno-ethical orientation shapes corporate ethical values.

Table 28-Summary of Regression results

IV	DV	Unstandardized co-efficient	Standard Error	Standardized Co-efficient (β)	t value	R-square	P-value
TE	CEV	0.348	0.180	0.295	3.71	0.241	0.046*

*Source: Primary Data, * Sig at 0.05, TE- Techno-ethical orientation, CEV- Corporate ethical values, IV- Independent Variable, DV- Dependent Variable*

Moderation analysis

The moderation effect of each one of the two digital citizenship dimensions in relation to techno-ethical orientation as an independent variable was analysed in great detail using covariance-based structural equation modelling (SEM) AMOS on IBM SPSS. The results of table 29 represent a significant influence of online respect as a moderator in strengthening the relationship between techno-ethical orientation and corporate ethical values (*β= 0.010, t= 0.640, p <0.05)*. It explains that in addition to an individual's techno-ethical orientation, showcasing online respect will ensure the establishment of ethical values in a corporate. Thereby supporting the H10 of the study that online respect moderates the relationship between techno-ethical orientation and corporate ethical values

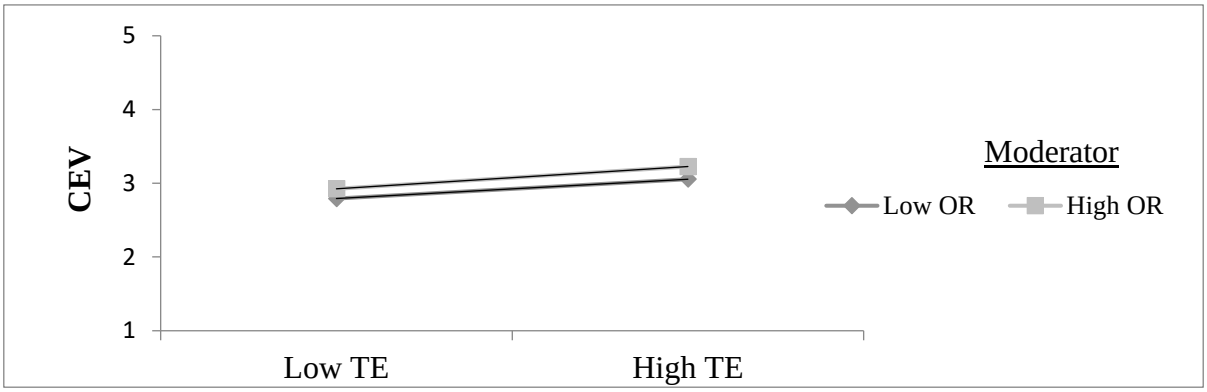
Table 29- Moderation analysis summary for OR as moderator

Relationship	Beta	*t value*	*p*-value
Techno-ethical orientation ⟶ Corporate ethical values	0.141	1.813	0.050*
Online respect ⟶ Corporate ethical values	0.076	0.514	0.610
Techno-ethical orientation*Online respect ⟶ Corporate ethical values	0.010	0.6405	0.049*

*Source: Primary Data, *Sig at 0.05*

Figure 17 indicates that the relationship between techno-ethical orientation and corporate ethical values strengthens at low and high levels of online respect (OR).

Figure 17: Moderation effect of OR on TE and CEV



Source: Primary data

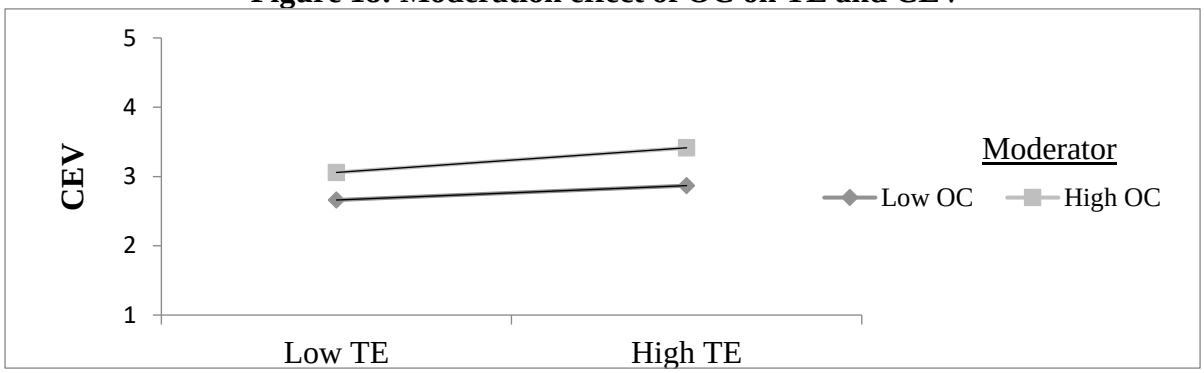
Similarly, in Table 30, online civic engagement (OC) positively and significantly impacts the relationship between techno-ethical orientation and corporate ethical values *(β= 0.037, t= 1.533, p<0.05)*. Figure 18 represents the moderating impact of online civic engagement and indicates that the relationship between IV and DV reinforces at both low and high levels of moderation. Thereby supporting the H11 of the study that online civic engagement moderates the relationship between techno-ethical orientation and corporate ethical value.

Table 30- Moderation analysis summary for OC as moderator

Relationship	Beta	*t value*	*p*-value
Techno-ethical orientation ⟶ Corporate ethical values	0.141	1.813	0.050*
Online civic engagement ⟶ Corporate ethical values	0.236	0.876	0.386
Techno-ethical orientation*Online civic engagement⟶ Corporate ethical values	0.037	1.533	0.013*

*Source: Primary Data, *Sig at 0.05*

Figure 18: Moderation effect of OC on TE and CEV



Source: Primary Data

Personal values are the bedrock of ethics as they guide what a person considers favourable/unfavourable. Values serve as a yardstick in prioritising decisions and goals. Similarly, in making business decisions, corporate values serve as a guiding light to achieve the goal of productivity, ethical culture, climate, competitiveness, etc. Previous studies have demonstrated that manager values, leadership, and organisational climate impact ethical codes, conduct, and decision-making (Kadriye & Kumkale, 2020; Rajitha, 2022; Smimou, 2020). This study further identifies and highlights the emergence of techno-ethics as an axiomatic component of the technosphere. One of the conclusions drawn from this study is that CEV is an amalgamation of the ethical orientation of its members. In a technology-mediated territory, the individuals working with technology exhibit a techno-ethical orientation, which is found to satisfactorily predict and contribute to creating a corporate value system. Additionally, this study re-establishes the importance of DC in a novel context by exploring the moderating role of DC in strengthening the relationship between techno-ethical orientation and CEV. The results revealed that the manifestation of online respect and online civic engagement at both low and high levels positively reinforces the institutionalisation of CEV.

CHAPTER 5: IMPLICATIONS

Theoretical Implications

There are several significant theoretical contributions of the present study. Firstly, the study offers a reliable and valid scale to measure the technology-oriented ethical behavior of individuals. The scale is posed to help future researchers to enlarge the realm of ethics and enrich the possibilities and forms of approach in which people take their moral responsibilities (Kiran et al., 2015). Secondly, the study provides an insight into intergenerational technology acceptance and usage pattern of three generations, i.e., pre-millennials, millennials, and post-millennials, in light of ethical domain. The majority of previous studies are restricted to compare the generational differences in technology usage and their workplace behavior only. Thirdly, the present study inspires a way to look at the shifting of ethical positioning of younger generations. Instead of labeling post-millennials as "unethical", we request more researches to accommodate the techno-ethical orientation of generation Z in organisational policies. Thus, the current study offers a new paradigm to techno-ethical studies. Fourth, the findings of this study made significant contribution to existing theories in several ways. One of the prominent models referred as "Igbaria's model" posited that perceived fun and perceived usefulness influences behavior (computer usage) and attitude towards new technology acceptance or rejection (Igbaria et al., 1994). Consistent to this view, millennial and post-millennial of this study is perceiving technology as useful and fun compared to their counterparts. Therefore, their technology-oriented behavior is shaped by these motivators. The results presented in this study further strengthened the notion of Unified theory of acceptance and use of technology (UTAUT) (Venkatesh et al., 2003). According to UTAUT, age and experience moderate the impact of usage intention and behavior. Facilitating conditions such as availability of guidance and assistance for computer usage are significantly impacted by age and experience. With age, individuals require more assistance in operating new technology and organisations should create such facilitating environment to do away with computer anxiety or inability experienced by pre-millennial. Lastly, the results of the study offer empirical evidence of generational theory in non-western context also. The theory was developed in the western background, and most of the previous studies on generation theory were confined to western respondents.

SCT has underpinned several studies in IT, ethics, psychology, and science. Notably, the analysis of this study is considered one-of-a-kind to evaluate the application of SCT in techno-ethics. Given the pervasive internet use and technology in organisations, this study's analysis revealed the need for a digital and ethical code of conduct. The study contributed to

creating new insights into three areas of interest to the research community: (1) techno-ethics; (2) ethical decision-making; and (3) technological frames. This study confirms the finding of the majority of the relationships between the constructs as suggested in the past literature (e.g., the interaction between technology and ethics that shapes ethical decision-making). Moreover, the framework of technological frames has not been studied in the ethical domain. The study results supported that the frames they used influence persons' ethical orientation towards technology. Therefore, this study provides a new dimension to consider the role of ethics when a decision-maker makes sense of the technology around him. As survival of an organisation is impossible without technology, technological frames shape technology trajectories over the entire technology lifecycle (Kaplan & Tripsas, 2008).

The study concurs with previous ethical studies where SCT was considered relevant in determining an individual's ethical conduct and operation. In her work *Technology and the Virtues, Shannon Vallor (2016)* made a compelling argument for introducing virtue ethics in the ethics of technology discourse. Vallor (2016) specified techno-moral virtues such as flexibility, civility, courage, techno-moral wisdom, etc. Therefore, the findings of the present study have contributed to the work of Vallor (2016) by adding techno-ethics and digital citizenship as a virtue that plays a significant role in changing the technology scenario.

Practical Implications

This study makes several practical implications for modern organisations that house employees of all three generations. It is being argued that existing organisational policies and HRM practices have been drafted by pre-millennials (Ng and Parry, 2016). And, thus aspirations and concerns of younger generations are yet to be fully integrated into these policies and practices. The same is also true for the firm's ethical policy regarding the use of technology in the workplace. The younger generations have already started to demand the freedom to use technology at the office. In this regard, it is being proposed that the modern manager should consider the techno-ethical orientation of post-millennials a new normal and organisational ethical policies may be revised accordingly. HR managers are always admired for being flexible and for their time-dependent decisions. Also, organisational culture is "organisation of character" (Sauser Jr., 2013), where the culture should promote pro-active ethical behavior. It demonstrates both espoused and lived standards of ethical behavior by reviewing the standards on a timely basis. Thus, organisational techno-ethical policies may be revised in light of changing technology usage, norms and its associated attitude of the new generation workforce. Such policy revision also requires training of older generation employees to enhance their

tolerance and acceptance of new rules. This research re-establishes the fact that generational difference affects the workplace in a positive way (Supervisor & Hughes, 2019). Research had mentioned the importance of mixing generations as they all bring something different to the workplace and can all learn from each other. Nevertheless, management need to approach different generations in varying ways. Focusing on management technique specific to age is crucial and will benefit both the organisation and the employee. To manage generational diversity, author recommend intergenerational training & mentoring, digital-based learning, experiential learning, collaborative learning, opportunity for self-job crafting and workplace fun are being important measures to ensure effective management of multigeneration workplace.

Several researchers (see Giunta, 2020; Holton & Fraser, 2015; Boitnott, 2016) and practitioners believe that future organisations belong to generation Z or post-millennials. These new generation employees will start playing a pivotal role in decision-making in the next five to ten years. Shortly Gen Z will represent almost 30% of the world population and 25% of the global workforce (Gomez et al., 2018). Moreover, managers acknowledge that the younger generation are more positive about the future than their older colleagues and that they are more adaptable and open to change. Deloitte's International Survey of the Third Millennium Generation (2019, 2020) reported that generation Y and Z respondents are ready to immediately reconsider or break off their relations with companies if the activities and values of such companies contradict their beliefs. Therefore, a pro-young generation techno-ethical policy is required to make the organisation ready for future employees. A liberal and open policy will help a company in attracting and retaining talent with no other efforts. Providing timely access to upskill programs will ensure smooth shifting in ethical positioning as and when new technology emerges. Setting up of an online or digital discussion forum for employees to interact with other seniors or colleagues will benefit in facilitating information dissemination and collaborative learning.

The researcher recommend ethical leadership to emerge that value open-door policies, and flexible environment for upcoming generations (based on their values and attitudes). Leaders holding onto "norms" developed decades ago might have issues connecting with the younger generations. It is up to leadership within an organisation to adapt their styles to conform to the new dynamics of the workplace (Aube, 2015). To accommodate ethical principles in the technology use, executives should provide strong and unwavering ethical leadership, and supportive institutional environment for effective implementation and utilisation of technology in the organisation (C. Chan & Ananthram, 2020). Ethical leadership

create a positive ethical climate and a sense of obligation for their employees to reciprocate similar behavior (Babalola et al., 2019). The training related to corporate policies with regard to ethical usage and practices in the organisation to the new entrants will enable development of trusty, loyal and respectable work environment. Bejtkovsky (2016) had corroborated the fact that there is a need to incorporate generational values within the workplace for improved retention and organisational efficiency. Companies that manage to understand and motivate gen Z will guarantee their success and gain the benefits they provide to the work environment (Merriman, 2019). Demonstration classes for appropriate and ethical use of technology, and inter-generational learning can reduce the digital divide to some extent.

The present study's results will enable managers to develop strategies for mitigating employee risk and unethical practices. The question is how to ensure that technology usage in the industry is ethical. Knowing one's ethical orientation towards technology allows managers to instigate ethical decision-making in the organisation, focusing on sustainability and ethical environment. Adopting transparent technologies that can monitor and streamline the business processes ethically at the expense of increasing unethical technology-related practices is insufficient to justify. Therefore, decision-making is a pivotal process for the long-term establishment of an organisation and the proper functioning of business activities. Previous researchers had established the role of ethical decision-making on a firm's performance, employee well-being, commitment, job satisfaction, etc. But the results of this study will enable managers to consider the role of social and organisational factors in influencing ethical choices. For successful implementation and utilisation of technology, managers have to ensure that those technologies provide positive benefits to the users, employees are comfortable using technology, and the management supports the use of technology. All factors taken together will enhance the experience of technology users, and as a consequence, this will lead to techno-ethical judgment, culture, and decision-making. In addition, the results of the study will be beneficial for businesses and policymakers in the technosphere in the following ways: 1) Companies in India should set up a continuous monitoring mechanism to track unethical practices in the firm that can severely tarnish its image as a leading contributor to the global economy. Such surveillance and monitoring tracker can help identify the wrongdoers before they worsen the firm's goodwill, and steps could be taken to implement an ethical code of conduct concerning technology usage; 2) A strategy and policy to regulate and govern the implementation and utilisation of modern technology such as blockchain, cloud computing, big data, internet of things, business intelligence, smart robots, etc., should be expedited on an urgent basis to combat a further surge in unethical practices; 3) Since employees fear a loss of

their job due to the introduction of technology and their incapability to adopt working with new technology, appropriate training and development initiatives should be encouraged for employees at all levels. Technology uncertainty is one of the leading reasons for rising unethical conduct. Nevertheless, organisations should plan training to get rid of uncertainty. Teaching optimum utilisation of technology can foster creativity, innovation, and value addition to the firm through an employee ethical code of conduct; 4) Rewarding suppliers and employees- Providing incentives to those who perform ethically can be a useful strategy for developing a culture of ethics.

The study's conceptualisation and operationalisation of techno-ethics involve not only personal factors but also an extension to organisational level. The results highlight how a techno-ethical orientation translates into corporate ethical values. Therefore, managers must consider the collective nature of the techno-ethical orientation of their employees while framing a value system for the organisation. Several practical approaches, such as delivering techno-ethical training and digital citizenship education to the employees, will yield positive outcomes such as better and more effective utilisation of technology for the highest good for human beings.

CHAPTER 6: LIMITATIONS AND SCOPE FOR FUTURE RESEARCH

Even though this study has made several contributions, there are limitations with regard to methodology, sample, and inclusion of variables. It is acknowledged that there are limitations in using a questionnaire as the sole method for data collection in this study. The research was limited to Indian respondents, and generalizability may pose a concern in validating the findings in another context. The sample size was not equal for each cohort because of the removal of many outliers. Concerning methodology, the quantitative technique is considered insufficient to capture the whole picture of the relationship among variables. Therefore, the author recommend a cross-cultural or multicultural mixed-method study to test and validate the said relationship empirically. Future studies investigating the role of other relevant factors using interviews or longitudinal studies can provide a comprehensive idea of how technology use has changed over generations and what future holds for the next generation. Face to Face interviews will provide immense information that is necessary for our understanding of factors influencing the digital divide or techno-ethical orientation with technology usage. Future studies might explore the social environment, experience, gender, and ethical judgment that impact the techno-ethical orientation of people. A comparative study before and during the introduction of the digital technologies would provide a better idea of how an employee behaves and responds to technological innovations. The use of ethical dilemmas or scenarios will examine the wider implication of technology and ethics interrelation. Further research could investigate the mediating or moderating effect of factors such as digital literacy, generational differences, and technology exposure influencing the relationship between techno-ethical orientation and corporate ethical values.

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APPENDIX A: TECHNO-ETHICAL ORIENTATION (VERMA & GARG, 2022)

Instructions- Please rate your response according to the scale provided below: 1- highly unethical; 2- unethical; 3- neutral; 4- ethical; 5- highly ethical

1. Reading and forwarding emails of others without their consent
2. While at work, browsing the organisation internet for personal needs
3. Sending files with viruses to others intentionally
4. Sharing confidential information with others on social media/online platforms
5. Recording meetings without prior permission from employer/supervisor
6. Taking pictures of colleagues in the premises without their awareness
7. Copying software from the organisation for personal use
8. Printing documents at the organisation for personal use
9. Not giving due credits to someone for providing project-related material
10. Discussing negative aspects about the colleagues/organisation with others on internet
11. Using organisation's internet for recreational purposes
12. Using instant messaging apps during office hours in the organisation
13. Downloading files at the organisation from the internet for personal use
14. Tracking the data from confidential sources to threaten or defame the other person

APPENDIX B: ETHICAL DECISION-MAKING (CASALI, 2011)

Instructions- When fulfilling the requirements of your position in your organisation, please indicate the importance of the followings in your decision-making process.

Rate your level of agreement/disagreement according to the scale provided below: 1- Extremely important; 2- Very important; 3- Fairly important; 4- Not very important; 5- Not important at all

1. Providing the highest economic return (profit) for the organisation
2. Minimizing costs for the organisation
3. Protecting the reputation of the organisation
4. Optimizing resources of the unit/department
5. Attaining organisational yearly budgets (short-term)
6. Being in line with the organisational mission
7. Generating the greatest overall benefits for the department/organisation
8. Not harming the clients/vendors
9. Respecting organisational' rules and regulations that have been created for the greatest benefit for all stakeholders
10. Obeying the law (state and central)
11. Creating the greatest overall benefit for the local community
12. Creating the greatest overall benefit for the wider community
13. Being most in line with your core personal values
14. Being most in line with the person you want to be
15. Respecting dignity of those affected by the decision
16. Being able to empathize with clients/vendors
17. Acting openly when making decision
18. Making "care for the affected" is paramount in determining decision alternatives
19. Giving the opportunity to all affected parties or their representatives to have input into the decision-making process
20. Treating others as you want others to treat you
21. Treat people as ends not as means
22. Ensuring that confidentiality is maintained at all times
23. Maintaining a fair process at all times
24. Ensuring that the organisation "duty of care" is maintained at all times

APPENDIX C: TECHNOLOGICAL FRAMES (SPIETH *et al*., 2021)

Rate your level of agreement/disagreement according to the scale provided as below: 1- strongly disagree; 2- disagree; 3- somewhat disagree; 4- neither agree nor disagree; 5- somewhat agree; 6- agree; 7- strongly agree

Personal Attitude

1. My attitude towards technologies is positive
2. I have high expectations of technologies
3. Technologies are an important part of my life
4. I regularly try to obtain information about technologies

Application Value

1. Technologies could facilitate the coordination of my work tasks
2. Technologies make my work more flexible
3. Technologies reduce the possibility of making mistakes in my work
4. Technologies increase the effectiveness of my work steps

Organisational Influence

1. My colleagues remind me to use technologies in my job
2. My colleagues regularly recommend technologies to me
3. My colleagues demand that I use technologies for my job
4. My colleagues help me use technologies for my job

Supervisor Influence

1. My supervisor is willing to integrate technologies into the firm
2. My supervisor requests that I use technologies
3. My supervisor regularly speaks about technologies
4. My supervisor is an expert in the handling of technologies

Industry Influence

1. Our competitors demand the use of technologies
2. Our competitors successfully use technologies
3. Our customers demand the use of technologies
4. Our suppliers demand the use of technologies

APPENDIX D: DIGITAL CITIZENSHIP SCALE (JONES & MITCHELL, 2016)

Instructions: Rate your response options using a 5-point scale ranging from 1- “not at all like me” to 5- “very much like me.”

Online respect

1. If I disagree with people online, I watch my language, so it doesn't come across as mean
2. I am careful to make sure that the pictures I post or send of other people will not embarrass them or get them into trouble
3. My favorite places to be online are where people are respectful toward each other
4. I think about making sure that things I say and post online will not be something I regret later
5. I do not add to arguments and insulting interactions that happen on the internet
6. I am careful about how I say things online, so they don't come across the wrong way

Online civic engagement

1. I like to present myself online as someone making positive choices
2. I have used the Internet to improve my school or my town in some way
3. I have used the Internet to learn how I can help a friend or help other kids in general
4. When I am online, I try to end arguments or dramas when they develop
5. I have used the Internet to share something that I am good at

APPENDIX E- CORPORATE ETHICAL VALUES (HUNT et al., 1989)

Instructions: Rate your response on a seven-items scale from 1 being strongly disagree to 7 being strongly agree.

1. Managers in my company often engage in behaviors that I consider to be unethical.
2. In order to succeed in my company, it is often necessary to compromise one's ethics
3. Top management in my company has let it be known in no uncertain terms that unethical behaviors will not be tolerated.
4. If a manager in my company is discovered to have engaged in unethical behavior that results primarily in personal gain (rather than corporate gain), he or she will be promptly reprimanded.
5. If a manager in my company is discovered to have engaged in unethical behavior that results primarily in corporate gain (rather than personal gain), he or she will be promptly reprimanded.