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In the Age of Automation: Impact on Human Values, Ethics, and the Risk of Dehumanization

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ABSTRAK

Teknologi otomatisasi telah menjadi bagian dalam kehidupan manusia di era modern ini. Pengembangan teknologi otomatisasi yang bijak perlu menyertakan pertimbangan nilai-nilai kemanusiaan, nilai etika dan mitigasi resiko dehumanisasi. Studi ini bertujuan untuk mengidentifikasi dampak teknologi otomatisasi terhadap nilai-nilai kemanusiaan, nilai etika dan resiko dehumanisasi dengan metode *systematic literature review*. Artikel jurnal relevan yang terpublikasi dalam rentang 5 tahun terakhir dikumpulkan dari *database* Scopus, Web of Science dan Google Scholar untuk kemudian di*review* dan dianalisis. Hasil *review* sistematis menunjukkan bahwa teknologi otomatisasi berdampak pada lunturnya nilai empati, kebebasan, transparansi, martabat dan keadilan. Teknologi otomatisasi juga menimbulkan masalah etika seperti pelanggaran privasi dan data pribadi, diskriminasi, resiko keselamatan dan kepercayaan publik. Terakhir, teknologi otomatisasi berpotensi menyebabkan dehumanisasi seperti berkurangnya interaksi dan penggantian peran manusia, depersonalisasi layanan dan objektifikasi manusia.

ABSTRACT

Automation technology has become a part of human life in this modern era. The wise development of automation technology needs to include consideration of human values, ethical values and mitigation of dehumanization risks. This study aims to identify the impact of automation technology on human values, ethical values and the risk of dehumanization using a systematic literature review method. Relevant journal articles published within the last 5 years were collected from Scopus, Web of Science and Google Scholar databases to be reviewed and analyzed. The results of the sistematic review show that automation technology has an impact on the erosion of empathy, freedom, transparency, dignity and justice. Automation technology also raises ethical issues such as violation of privacy and personal data, discrimination, safety risks and public trust. Finally, automation technology has the potential to cause dehumanization such as reduced interaction and replacement of human roles, depersonalization of services and objectification of humans.

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INTRODUCTION

Technological developments have brought significant changes in the way humans work, interact, and fulfill their daily needs. One of the most influential technological innovations is automation, which includes the use of various types of robots, artificial intelligence (AI), chatbots, and algorithm-based systems (Ivanov et al., 2020) to replace or support human tasks. The rapid progress of technology over the past decade has increased the capabilities of automation technology so that it can be reached and used in various industrial sectors (Moutsatsou et al., 2019) such as health, education, security, to agriculture and livestock. By 2022 alone, according to a report by The International Federation of Robotics, the number of new industrial robots installed was 553,052 units, an increase of 5% from the previous year. The total number of industrial robots in operation until 2022 reached 3,903,633 units globally.

While automation offers great benefits such as efficiency, productivity and innovation, it also presents complex challenges to human and ethical values. In many cases, automation can replace human roles in the workplace, leading to a reduction in the need for human labor. Ivanov et al. (2020) state that driven by demands for productivity, competitiveness, profitability, and lower reliance on scarce human resources, companies are investing heavily in automation technologies and replacing some of their employees. This massive implementation of automation is changing the way humans work (Ernst et al., 2019), creating concerns and fears for human labor to lose their jobs and be replaced (Fiaidhi et al., 2018). Of course, it is ironic to see the reality on the field that the role of humans is increasingly eroded by the sophistication of automation, so it is necessary to have a flashback why automation is needed.

According to Laudon (2020), manual processes have speed limitations, the process of collecting, processing, and analyzing data in manual systems takes a long time. Each stage requires intensive human interaction, which results in a slowdown in the overall process. According to Stair & Reynold (2018), manual systems have a risk of error. The high possibility of human error in recording and calculating data is one of the serious problems in manual systems. This imperfection can be fatal, especially in contexts where data accuracy is crucial. In addition to the limitations of manual systems, there is indeed a separate field that specifically focuses on technology development and impacts the sales of technology products that package their marketing as a challenge in the application of the latest technologies that can unwittingly minimize and even replace the role of humans. With this background, automation is either accepted or forced to be accepted, which raises ethical dilemmas about human dignity, fairness in economic distribution, and the individual's right to work.

Furthermore, automation can also create emotional disengagement in human interactions, potentially leading to dehumanization, which is the process of losing the perception of one's humanity or human rights (Bender, 2024). For example, the use of the Google Maps application has been able to help eliminate human functions, one no longer needs to ask the surrounding community if they are lost in a place and have no clue about directions and destinations. This can not only be used as a real example of dehumanization but also as an example that technology can change a value or culture that has been built for a long time. Klapperich et al. (2020) stated that automation may be able to free humans from activities they do not enjoy, but along with this, humans can lose more meaningful experiences in life. In the past, machines could defeat human physical strength, but today, even human cognitive abilities have been surpassed by artificial intelligence (Wang & Siau, 2019). This leads to the loss of human dignity as an intelligent being and the risk of deskilling that regresses the quality of human life.

This study uses a systematic literature review to review in depth how automation affects human values, ethics and dehumanization. There have been many studies on the effects of automation in transportation (Alipour & Dia, 2023; Kumari, 2023), healthcare (Maeckelberghe et al., 2023; Möllmann et al., 2021; Tang et al., 2023), education (Bai, 2024; Shyroka et al., 2023), employee recruitment systems (Hunkenschroer & Luetge, 2022; Sima et al., 2020), and other fields. This research attempts to collect and process previous findings on automation and its impact on human values, ethics and dehumanization in a comprehensive and universal perspective. There are three research questions raised in this study, namely:

1. How does automation affect human values?
2. What ethical issues arise from the phenomenon of automation?
3. How does automation lead to the risk of dehumanization?

This research contributes to a broader and more nuanced knowledge of the impact of automation in various sectors and is supported by relevant research. Through the findings of this research, it is expected that the developers of automation technology can understand how to overcome the loss of human and ethical values and the risk of dehumanization in the process of adopting the automation technology.

LITERATURE REVIEW

Automation

Automation can be defined as technology that actively selects data, transforms information, makes decisions, or controls processes (Lee & See, 2004). Parasuraman & Riley (1997) define

automation as the execution of a function by a machine (usually a computer) that has previously been performed by humans. According to their research, automation evolves over time and when automation has been fully implemented, this automation technology is seen as a machine. One of the advantages of automation systems is their ability to perform complex and repetitive tasks without error (Hoff & Bashir, 2015), both tasks that require physical labor and cognitive abilities (Wang & Siau, 2019). Automation technology usually operates based on pre-programmed "rules" (Evans, 2017). This is so that automation technology can perform monotonous tasks and free humans to focus on more complex, creative and emotionally engaging tasks (Wang & Siau, 2019).

Human Values

Human values are fundamental guidelines in human interactions and give meaning to life (Rani et al., 2022). They include acceptance, empathy, respect, compassion for other humans, perseverance, tolerance, honesty (Dewangan, 2021), and many more. Human values are important in society, providing purpose and guidance, especially in today's materialistic world (Rani et al., 2022). Teaching human values from an early age can create a peaceful and harmonious life. No human being is able to work perfectly without having human values and feelings. Human values reach every aspect of life in different ways.

Ethical Values

The word ethics comes from the Greek "ethos" which means character (Pabla, 2011). Ethics according to Badroen et al. (2015) is a behavioral system of a person or group of people that is composed of a system of values or norms that apply in that group of people. Ethics is the study of human behavior, not only determining the truth as it is, but also investigating the benefits or goodness of all human behavior (Siregar, 2015). Ethical values may reflect a perspective on what a person considers right or wrong (Haryanto & Rahmania, 2017), which influences their attitudes and behaviors. Ethical values provide a framework for behavior evaluation and decision-making in various sectors.

Dehumanization

Dehumanization is the act of viewing or treating others as if they are not fully human (Haslam & Stratemeyer, 2016). Dehumanization is caused by a cognitive failure to see others as fully human. This can occur when a person is viewed through a lens that ignores their humanity and is viewed based on characteristics such as race, ethnicity, or social status (Bender, 2024). According to Al-Amoudi (2022), dehumanization is divided into three: denial of human development, dehumanization of minority groups and dehumanization of processes. The denial of human development refuses to recognize human capabilities in moral judgment, expression

of emotions and social relations. Dehumanization of minorities occurs when minorities are viewed as entities that lack essential human traits. Process dehumanization refers to the replacement of human activity with automated systems that operate without the use of human reason or reflectivity.

RESEARCH METHOD

This research uses the Systematic Literature Review (SLR) method. SLR is a method used to identify, evaluate and synthesize findings from research on specific topics in specific literature (Sima et al., 2020). The purpose of SLR is to build an overview, which is adequately documented on a particular topic and produce an accurate literature summary that provides an overall effect estimate for the research population (Mariano et al., 2017).

a. Literature Search Strategy

The literature reviewed in this study were journal articles from the Scopus, Web of Science and Google Scholar databases. Keywords used in the article search include “automation”, “human value”, “ethical value”, “dehumanization”, “moral value”. The publication period was set in the range of 2020 to 2024 to ensure the novelty of the findings in the research. This literature search used the help of Publish or Perish 8 software.

b. Inclusion and Exclusion Criteria

This study only used scientific articles from journals, and eliminated articles from other sources. Articles reviewed were those that focused on the impact of automation on human values, ethical values or dehumanization. The type of automation was not restricted in this study. Table 1 summarizes the inclusion and exclusion criteria applied.

Tabel 1. Inclusion and Exclusion Criteria

Criteria	Inclusion	Exclusion
Topic	Focused on the impact of automation on human values, ethical values or dehumanization	Not focused on the impact of automation on human values, ethical values or dehumanization
Publication range	2020-2024	Out of the inclusion year range
Language	English	Not English
Source	Journal	Not journal
Access	*Open access*	Not *open access*

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c. Article Review and Analysis

At this stage, the selected articles were reviewed based on the inclusion and exclusion criteria set previously. The review and analysis aimed to find answers to the research questions posed in the introduction. The results of this review and analysis were then systematically organized as research findings.

RESULT & FINDINGS

Searching journal articles with Publish or Perish 8 software using the keywords determined in the method section resulted in a total of 767 pieces of literature. The first stage of elimination is based on the type of literature. This study only uses literature in the form of journal articles. A total of 427 journal articles were obtained at this stage. Furthermore, duplicates were detected from three databases (Scopus, Web of Science, Google Scholar) as much as 42 literatures, so the total articles at this point were 385. In the third stage, the abstract of the article was screened to determine the focus of the research. At this stage, 76 articles were obtained that were relevant to the study topic. Then, a full text search was conducted for each article. The result is 32 articles that can be accessed in full text. These articles were then reviewed and analyzed to answer the Research Question (RQ) in this study. The following is a synthesized analysis of the reviewed articles.

RQ1. How does automation affect human values?

Human values are basic values that guide interactions and give meaning to life (Rani et al., 2022). Some examples of human values include honesty, integrity, respect, empathy, affection, acceptance, and many more (Schwartz, 1994). Automation can support or suppress human values and human well-being, depending on how it is implemented (Furendal & Jebari, 2023). The following presentation will explain how automation affects human values in various sectors of life.

Empathy. Morandín-Ahuerma et al. (2024) examining AI and dehumanization in the labor market stated that reliance on AI in decision making and problem solving can reduce empathy in social and professional contexts. A similar opinion was presented by Akingbola et al. (2024) who examined the application of automation in healthcare. The integration of AI in healthcare can lead to the erosion of empathy, sympathy and compassion, which are essential for building trust in doctor-patient relationships. AI systems often fail to understand and respond to human emotions, which can weaken the interpersonal bonds that are crucial for maintaining therapeutic relationships. Shyroka et al. (2023) who examined automation in education presented similar findings, that the use of technology that facilitates interactions

between fellow students as well as between students and teachers through online platforms, can reduce face-to-face interactions that diminish opportunities for students to develop empathy and emotional intelligence.

Autonomy and Freedom. Autonomy, the capacity of humans to make independent decisions, may be weakened by automation guiding human behavior and decisions. Marszałek-Kotzur (2022) examined how cognitive technology leads to dehumanization stating that when algorithms control significant aspects of people's lives, they may feel unable to make their own decisions and risk losing their identity. Khogali & Mekid (2023) provide a similar statement that the use of AI that requires the collection and monitoring of users' personal data will make them feel their freedom is restricted, triggering feelings of helplessness and loss of control over personal data. Fritts & Cabrera (2021) who examined the use of AI in employee recruitment systems explained that recruitment candidates may feel disempowered when their qualifications are assessed by algorithms that are not transparent and lack insight into the decision-making process.

Accountability and Transparency. Herzog & Hoffmann's (2020) research on the intersection of automation technology and moral values explains that non-transparent technology can hinder the human ability to scrutinize and understand how decisions are made, potentially leading to a misalignment between human values and the output of automation technology. Bender (2024) and Marszałek-Kotzur (2022) present similar arguments that when AI takes over decision-making roles, accountability for those decisions becomes difficult to accept. This will weaken the sense of human responsibility and increase dependence on technology, which will diminish ethical and human values. It is important to ensure that AI systems are designed with accountability and transparency in mind, which are crucial aspects for maintaining the trust of users (Bai, 2024).

Dignity and Self-Esteem. Khogali & Mekid (2023) state that when employees feel disrespected and treated like machines rather than individuals, these perceptions can lead to feelings of injustice and loss of employee dignity in the workplace, which has a negative effect on employee job satisfaction. The above statement is in line with Farina et al. (2024) who argue that automation in work through AI allows for a re-evaluation of employees' personal identity and self-esteem, which can cause employees to lose a sense of security in their position or title at work. Morandín-Ahuerma et al. (2024) explain that the increasing reliance on AI can undermine human dignity by considering humans as data or output of an algorithm. Technology should serve to enhance and not diminish the human experience.

Justice and Equality. AI applications in the legal field are used for bail and parole decisions, or for sentencing a defendant (Farina et al., 2024). This may eliminate legal bias and adverse human interference, but reliance on algorithms can lead to outcomes that may not align with human notions of fairness, potentially worsening inequality in the law. Khogali & Mekid (2023) add that the potential bias of AI systems can undermine the value of justice. If AI technologies aggravate existing social discrimination or create new forms of discrimination, they may bring out inequalities in society, especially in marginalized groups.

RQ2. What ethical issues arise from the phenomenon of automation?

Ethics according to Badroen et al. (2015) is a behavioral structure of a person or group of people that is composed of a system of values or norms that apply in that community group. Ethical values become guidelines for humans in their behavior so that they do not violate the rights of other humans. In the field of automation, there have been many ethical issues that arise from various sectors. Vesnic-Alujevic et al. (2020) mentioned that one of the causes of the emergence of ethical problems from automation is the uncertainty or lack of transparency of automation technology. The following will describe in more detail the ethical issues arising from automation technology.

Data Protection and Privacy. Research by Díaz-Rodríguez et al. (2023) on trusted AI explains that AI systems often require large amounts of data, which raises concerns about how users' personal information is collected, stored and used by AI. Ensuring data protection and privacy in the use of AI for daily needs is a crucial element. The same issue arose in the study of Martinho et al. (2021) regarding concerns about data usage and surveillance by autonomous vehicles. Zawieska (2020) studied automation technology in industry 5.0 stating that the use of robots equipped with sensors and data collection capabilities raises concerns regarding privacy and monitoring risks. Monitoring tools can track performance, location and even personal data, raising concerns about how this information is used and who has access to it (Longo et al., 2020). Ethical issues related to consent, data ownership and privacy rights need to be properly addressed to avoid misuse of user data.

Discrimination. In the field of healthcare, Maeckelberghe et al. (2023) state that digital health systems should serve all patients fairly based on their needs. Digital health systems should guarantee that personalized care does not lead to disparities in healthcare access, which can lead to discrimination. Poszler et al. (2024) described the risk of algorithms used in self-driving vehicles reflecting biases in the training data. This can lead to unfair treatment of certain groups, such as pedestrians with darker skin tones are less likely to be recognized by object

detection systems. A similar opinion was expressed by Lund et al. (2023) that Large Language Models (LLM) such as ChatGPT can show bias in training data related to gender, race, ethnicity, and disability status. The use of LLMs in research is feared to impact the integrity of the results. Weiskopf & Hansen (2023) added that bias in AI is caused by the use of historical data that is not fully relevant, leading to discriminatory outcomes in areas such as hiring, rule-making and financial lending. AI systems need to be designed to support social equity and avoid biases that can lead to discrimination (Díaz-Rodríguez et al., 2023).

Security and Safety. Colombino et al. (2021) examining the ethical considerations of developing robots for disabled employees explained that a level of safety is required according to the specific tasks performed by the designed robots. This issue raises ethical questions regarding the responsibility of developers and organizations in ensuring that these robots operate safely in the work environment. Zawieska's (2020) research provides a similar statement that the safety issues that arise are related to human-robot interaction. It is important for developers to ensure that robots are able to interact with humans safely and effectively, especially for the application of robots in the health and care sector, so as to minimize the possibility of accidents. In the automotive sector, Poszler et al. (2024) state that self-driving vehicles rely on complex software and hardware systems, which are prone to malfunctions and failures. Technical failures, such as sensor malfunctions or software bugs, can lead to accidents if the vehicle is unable to accurately understand the situation or make safe decisions. Automated vehicles operate with imperfect information and probabilistic models, which raises ethical concerns regarding the ability of these technologies to make safe and ethical decisions in unpredictable situations (Siegel & Pappas, 2023).

Public Trust. The rapid development of automation technologies has been accompanied by an increasing demand for clear and transparent systems (Schicktanz et al., 2023), which allow users to understand how decisions are made by algorithms. This lack of transparency can lead to erosion of user trust (Masso et al., 2023), especially those from minority groups who may feel that their needs are not adequately considered or represented (Keyes, 2020). Yokoi & Nakayachi's (2021) research explores how automation systems in transportation and healthcare make moral judgments and whether these judgments align with human values. This research raises ethical questions about whether it is appropriate to trust machines to make decisions that have moral implications, especially when the judgment of automation systems may differ from the human perspective. Ethical automation technology requires developers to have a moral understanding during the design stage of the technology.

If developers do not consider ethical implications, the generated technological systems may not have the expected credibility (Lehner et al., 2022).

RQ3. How does automation lead to the risk of dehumanization?

Dehumanization is the process or act of removing humanity from a person or group of people (Patora, 2024). Dehumanization occurs when a person is described, viewed, or treated as non-human or less than human (Kronfeldner, 2021). Dehumanization due to automation technology poses serious problems for people and businesses. These problems are still poorly understood because their focus is separate from the growing dehumanization literature in various disciplines (Schultz et al., 2024). The following describes how automation leads to dehumanization in various fields.

Human Role Replacement. Al-Amoudi (2022) and Vesnic-Alujevic et al. (2020) state that as automation increasingly takes over tasks originally performed by humans, humans may feel their unique contributions and abilities are devalued or deemed no longer useful. This opinion is in line with Kerr et al. (2020) who state that automation can lead to widespread loss of human jobs, which not only affects their income, but also the loss of purpose and accomplishment that their work provides. Such perceptions lead to a sense of dehumanization, where individuals see themselves as mere cogs in the machine rather than useful contributors to their workplace (Ivanov et al., 2020). A similar opinion is presented by Bai (2024) that when decision-making in the learning process and its outcomes are predominantly done by algorithms, this can create a perception that individual contributions are not important, leading to a sense of inferiority among students and teachers.

Reduced Human Interaction. As automation replaces human roles, there is less opportunity for social interaction between individuals. This can lead to weakened sociability and emotional connections between individuals (Kerr et al., 2020). In healthcare, automation often replaces tasks that require personal interaction such as consulting with patients and providing emotional support. Akingbola et al. (2024) state that this shift can result in fewer face-to-face interactions between patients and health workers, weakening the personal connections that are important in building trust and empathy in doctor-patient relationships. Khogali & Mekid (2023) presented a similar fact that the absence of individual interactions during the hiring process can weaken the relationship between recruiters and candidates. Candidates may feel that their qualities and abilities are undervalued when evaluated solely through AI-based criteria, leading to a sense of alienation and objectification.

Depersonalization of Services. In the healthcare (Akingbola et al., 2024) and law justice (Farina et al., 2024) sectors, the increasing reliance on AI can lead to less personalized experiences for individuals. When healthcare or legal decisions are made by algorithms rather than empathetic humans, it can undermine the element of compassion and understanding that is crucial in both contexts. Akingbola et al. (2024) add that the use of chatbots or AI-generated automated messages may feel less authentic and understanding than messages provided by humans. Patients may be less satisfied and feel that their concerns are not properly addressed, leading to a sense of dehumanization.

Al-Amoudi (2022) states that AI-based decision-making often lacks transparency and normative reasoning, leading to dehumanization by overriding individual input and simplifying complex human judgments into algorithmic outputs. This simplification can degrade human knowledge and experience, as AI is unable to provide the diverse understanding that humans have in tackling various tasks (Bender, 2024).

Objectification. Zawieska's (2020) research on the involvement of ethical values in the field of robotics states that the technical focus in robotics automation technology mainly prioritizes efficiency and mechanical routines over ethical complexity. This leads to the perception that humans are only objects or components in a system, not as beings with personal character and moral values. Kerr et al. (2020) presented a similar insight that AI systems may ignore biases that occur in training data, leading to unfair treatment of certain groups. This mistake leads to dehumanization by considering individuals as just data, ignoring the unique characteristics and experiences of each individual.

In the field of education, Bai (2024) explains that the use of automated systems where the decision-making process is not transparent can lead to the occurrence of biases which, if left unaddressed, can lead to dehumanization through the generalized treatment of each student, ignoring the unique needs or conditions of each student. The objectification of automation technology cannot be applied to the complexity of different human needs.

The Impact of Automation on Human Values, Ethical Values and Dehumanization

Automation has gained widespread recognition as a profound revolution in today's society, shifting the essence of work and task completion processes. Organizations are faced with the potential for inevitable progress by incorporating computerized technologies into their operations (Haslberger, 2021). This integration drives a series of transformative benefits, including increased productivity, reduced costs, operational efficiency, and favorable workflow modifications. However, along with the significant advances of automation, it also poses a puzzle relating to its consequences on human values, ethics, and dehumanization.

As technology advances, there is an observable shift in human values, which often prioritizes efficiency and convenience at the expense of deep interpersonal relationships. This shift is visible in the way individuals interact with each other; reliance on artificial intelligence devices has led to an increase in virtual interactions, often at the expense of real relationships. The rise of generative artificial intelligence has enabled significant advances in areas such as healthcare and education, where efficient service delivery is paramount (Sai et al., 2024). However, these benefits risk to worsen disparities, especially among vulnerable populations who may be excluded from the digital world, ultimately jeopardizing the integrity and ethical standards underpinning human engagement (Hermann et al., 2024). Therefore, while technology has the potential to improve certain aspects of society, it also simultaneously challenges fundamental human values, requiring us to reconsider what it means to connect, empathize and make ethical choices in a rapidly evolving environment.

As automated systems increasingly take on roles originally held by humans, the ethical consequences of their decision-making processes come under scrutiny. The risk of misinformation and possible bias in AI can undermine trust and integrity in both personal and professional fields (Budhwar et al., 2023). An integral challenge of this technology is to ensure that decisions are aligned with human ethics. Moreover, as generative AI systems evolve, they may inadvertently generate content that misrepresents reality, complicating the already contentious relationship between human judgment and decision-making by machines. Therefore, exploring the ethical implications of automation technologies is crucial to protect against dehumanization in an automated world and to strengthen ethical standards in various sectors.

CONCLUSION

Automation technologies have the effect of diminishing human values such as empathy, freedom, dignity and justice. Automation technology also raises ethical issues related to privacy and data use, discrimination, user security and safety, and public trust. The risk of dehumanization needs to be considered in the development of automation technology to avoid the replacement of human roles, reduced human interaction, loss of service personalization and objectification of humans. Automation technology needs to be designed and used wisely to avoid any negative impacts that may arise in the process. Automation technology should support human productivity and not become a social and professional threat.

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