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Artificial Intelligence (Ai) And Its Influence On Human Productivity; An Investigation Among It Professionals

Chinthu Jose, Dr.S.Jegadeeswari,

Ph.D. Research Scholar in Management, Karpagam Academy of Higher Education, Coimbatore- 641 021
Ph.D. Research Guide, Assistant Professor, Department of
Commerce, Karpagam Academy of Higher Education, Coimbatore -641 021

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Abstract

Recent research in artificial intelligence focuses on the synergistic integration of various sub-disciplines to achieve machine-based capabilities in perception, comprehension, action, and learning, analogous to human cognitive processes. There is a growing consensus within the field of artificial intelligence that generative models possess the potential to induce significant transformations across a wide range of industrial sectors. In response to the potential for significant productivity gains, the software development field is actively integrating generative AI functionalities within its toolsets. Early projections suggest these advancements could lead to productivity increase ranging from a factor of two to ten in the forthcoming years.

However, while experts and organisations throughout the world commend AI's good function, this study shines light on the difficulties related with its adoption.

The purpose of the study is to investigate the influence of artificial intelligence on decision making, privacy concern and productivity among software professionals.

The initial data was obtained from 315 software professionals representing different companies in Infopark and Technopark. Purposive sampling method was selected to choose the respondents from the targeted group. Outcome of the investigation indicates that human decision-making, laziness, privacy and security concerns are significantly impacted by Artificial Intelligence (AI). The results show that AI has an impact on human slothfulness (68.9%), personal privacy and security concerns (68.6%), and poor decision-making (27.7%).

KEYWORDS: *Artificial Intelligence, Decision Making, Security concerns, human slothfulness*

Introduction

The application of Artificial Intelligence (AI) for software professionals is vast, and it is only growing as AI technologies become more integrated into various parts of software development and IT operations. In harnessing AI to improve efficiency, improve decision-making, and innovate in their area, software professionals are discovering new opportunities and difficulties.

AI empowers software developers by automating regular and time-consuming processes, freeing them up to

focus on more strategic and creative parts of software development. This involves automating code generation, testing, and deployment procedures, which speeds up the software development life cycle and boosts overall productivity.

RESEARCH GAP: Although the literature identifed on the influence of AI on employee productivity and security continues to grow, there is still a research edge gap regarding these effects, especially for software professionals. The literature on AI ethics makes it obvious that, in addition to its tremendous benefits, the development of AI poses a number of obstacles in terms of ethical values, behaviour, trust, privacy, and other issues. A significant trend in software development is the growing adoption of artificial intelligence (AI) technologies, leading to substantial advancements in the field.

This study highlights on three barriers associated with AI in the software field:

1. Privacy and security while using Artificial intelligence
   Software professionals face substantial hurdles when implementing AI technologies in ensuring data security and privacy. AI systems are appealing targets for cyber threats due to the sheer volume and diversity of data processed, necessitating ongoing monitoring against potential breaches.

2. Erosion of human decision-making
   Concerns have been raised regarding the potential decline in human reasoning due to incorporating AI in the software area. As AI systems take on more complicated jobs, there is a concern that dependence on automated decision-making could reduce human involvement, affecting important areas like creativity, intuition, and ethical reasoning.

3. Challenges of Human Slothfulness
   Over-dependence on AI for everyday work may decrease professional involvement and proactivity, limiting their ability to spot subtle challenges and propose novel solutions. Furthermore, when software professionals become acclimated to the convenience provided by AI, there is a risk of complacency and a loss of control over the outcomes produced by AI systems. This can make it difficult to detect and remedy flaws, biases, or ethical concerns in AI models.

While there are other problems about AI in the software field, these three are the most relevant and challenging issues in the current period. Furthermore, due to the study's constraints, researchers are unable to broaden their analysis beyond the designated scope.

Theoretical Frame Work

1. David Elliott and Eldon Soifer's article (2022) "AI Technologies, Privacy, and Security" delves at the complicated connection between privacy and AI technology. It emphasises the significance of comprehending privacy beyond mere information management and tackles people's hazy concerns about privacy in the context of AI, noting potential hazards and the need for clarification.

2. Ahmad, Sayed Fayaz ; Han, Heesup; Alam, Muhammad Mansoor et al. (2023) examines the potential consequences of AI in education, including its impact on student decision-making, academic performance, and safety, in the context of universities in Pakistan and China. The findings reveal significant concerns surrounding AI integration in education, highlighting the need for a balanced approach to address these issues.

3. Franke et al. (2022) discuss the potential for AI to enhance decision-making processes in production companies. The authors highlight the use of AI to analyze production process data and improve the quality of decisions made by human decision-makers. They provide a methodology for implementing AI-based knowledge enhancement and evaluating its effectiveness in improving decision-making. The article emphasizes the importance of balancing the goals of accuracy and interpretability in AI-based solutions and provides examples of AI applications in production planning and control.

4. Villegas-Ch, W., & García-Ortiz, J. (2023) reviewed previous research, identify gaps and open research areas, and provide recommendations for improving current frameworks. The proposed approach differs from previous approaches by providing a holistic view of the AI system, including its development, deployment, and operation phases. The authors highlight the need for further research in areas such as explainability, accountability, and ethical considerations.

5. Aldoseri A, Al-Khalifa KN, Hamouda AM. (2023) explores the critical role of high-quality data in AI applications, addressing key concepts, opportunities, and challenges. It provides significant contributions for scholars and professionals, emphasizing the need to address biases, ensure data security, and leverage advanced AI techniques across industries.

Following studies, the below hypothesises are proposed:

H1: Privacy and Security issues were significantly affected by AI.

H2: Human slothfulness is significantly impacted by AI

H3: The loss of human decision-making is considerably impacted by AI.

Methodology

Primary data collection method was used for the research. The first-hand data was collected from 315 software professionals representing various companies at Infopark and Technopark at Kochi and Trivandrum. The purposive sampling technique was specifically employed for selecting the sample group. Data was collected between November 2, 2023 and December 31, 2023, i.e., approximately two months..

Assessing validity and reliability ensures the integrity and consistency of both measurement tool and data used for subsequent evaluation. Item reliability and construct reliability are two essential methods used in structural equation modelling (SEM) for this. The outer loading of individual items is used for evaluating item reliability; a threshold of 0.706 is usually employed. Although under certain scenarios, an outside loading of even 0.5 may be adequate as long as it doesn't breach the belief of convergent validity. (Hair, Joseph & Alamer, Abdullah

2022). At the same time, a benchmark of 0.7 is broadly used to assess construct reliability using measures such as Cronbach's Alpha and composite reliability.

According to the data in the Table I, all items inside each construct have outer loading values larger than 0.7, with the exception of one item each in the artificial intelligence and decision-making constructs, which have outer loading values less than 0.7 but greater than the minimal limit value of 0.4.Furthermore, both of these show positive Average Variance Extracted (AVE) values. Additionally, each construct's reliability metrics, such as composite reliability and Cronbach's alpha, are above 0.70, confirming formation of items and construct reliability.

Table I: Validity and Reliability

Constructs	Item	Loadings	Cronbatch Alpha	Composite reliability	AVE
DM	DM1	0.767	0.722	0.803	0.521
	DM2				
	DM3	0.621			
	DM4				
AI	A1	0.752	0.732	0.912	0.569
	A2	0.721			
	A3				
	A4	0.778			
	A5				
	A6	0.732			
	A7				
HS	HL1	0.432	0.821	0.911	0.711
	HL2				
	HL3	0.842			
	HL4				
S&P	SP1	0.735	0.768	0.87	0.691
	SP3	0.821			
	SP4				

DM – Decision Making, AI- Artificial Intelligence, HS - human slothfulness, S&P – Safety & Privacy,

Convergent validity and discriminant validity are the two metrics used to assess the validity of data. AVE values are used to evaluate convergent validity, with a 0.5 as the threshold value (Hair, Joseph & Alamer, Abdullah. 2022). Based on the validity and reliability table, every construct has an AVE value greater than 0.5, indicating convergent validity. HTMT ratios, item cross-loadings are used in Smart-PLS to assess discriminant validity. HTMT levels needs to be less than or equal to 0.90 (JF Hair Jr et al., 2020), Table II demonstrates all items fall under this limit. As indicated in Table IV, all values of the AVE's satisfies this condition

Table II: HTMT values

	AI	DM	HS
DM	0.311		
HS	0.787	0.338	
S&P	0.831	0.309	0.596

DM – Decision Making, AI- Artificial Intelligence, HS - Human Slothfulness, S&P – Safety & Privacy,

Discussion

The demographic profile of the 315 persons who participated is shown in Table III. Of these, 152 people (48.3%) identify as female, and 163 people (51.7%) as male. The data was collected from software professionals. According to the table, 141 people (44.8%) are from Technopark, whereas 174 people (55.2%) are from Infopark.

The individuals are divided into three age categories based on age distribution: under 20, 20–26, and 27 years and up. The majority of them - 134 (47.1%) are between the ages of 20 and 26. In contrast, 71 respondents - 22.3% are under the age of 20, while 110 respondents -38.6% are over 27.

The academic background of the respondents is displayed in the table's last section. According to the data, 162 (51.4%) of the respondents are undergraduates, 105 (33.3%) are graduates, and 48 (15.3%), are PG.

Table III: Profile of participants

	Count	%
Gender		
Male	163	51.7
Female	152	48.3
Total	315	100
Location		

Kochi (Infopark)	174	55.2
Trivandrum(Technopark)	141	44.8
Total	315	100
Age Bracket		
< 20 years	71	22.3
20–26 years	134	47.1
>= 27	110	38.6
Total	315	100
Qualification		
Undergrad	162	51.4
Graduate	105	33.3
PG	48	15.3
Total	315	100

Fig. 1.- Structural model, which shows relation among variables

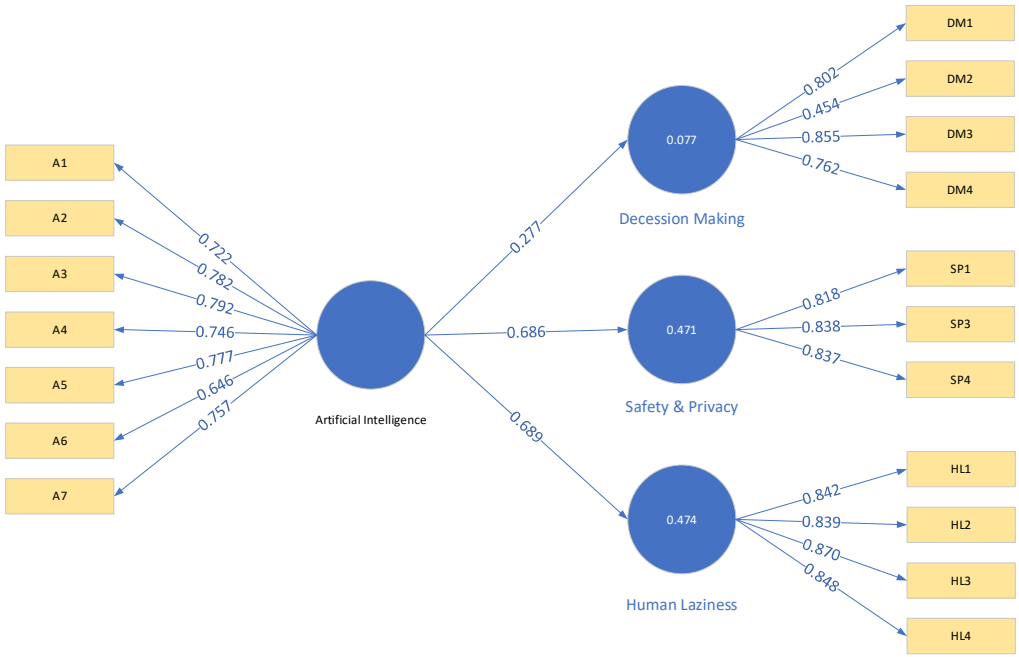

Table IV- Represents outcome of regression modelling, which shows the direct relationships among the variables.

Table IV: Regression Modeling

Relation	*t*-values	*p*-values	Remarks
AI → Decision Making	5.056	0.000	Supported
AI → Human Slothfulness	23.275	0.000	Supported
AI → Privacy & Safety	17.169	0.000	Supported
Above associations are statistically significant.			

Primary correlation, which has a beta coefficient of 0.256, concerns artificial intelligence and how it affects human decision-making. This indicates that a rise in artificial intelligence by one unit corresponds to a decrease in human decision-making by 0.256 units among employees. For this correlation, the t-value 5.056, surpassing critical value (1.89), while p-value registers at 0.000, signalling statistical significance with a confidence level below 0.05.

The following correlation relates to artificial intelligence and its link to human laziness. With a beta coefficient of 0.689, it suggests that for every unit increase in artificial intelligence, there is a corresponding 0.689-unit rise in human laziness. For this correlation, the t-value (23.275), exceeding critical value (1.89), and p-value is 0.000, signalling statistical significance below the 0.05 confidence level.

The ultimate correlation examines the influence of AI on individuals worries about privacy and security. With a beta coefficient of 0.680, it suggests that for every unit rise in artificial intelligence, there is a corresponding 0.656-unit rise in concerns regarding privacy and security. For this correlation, the t-value (17.169), greater than the critical value (1.89), and p-value is 0.000, indicating statistical significance below the 0.05 confidence level.

Significance of AI in our lives has risen significantly, impacting various aspects of our daily routines. Yet, akin to any technological advancement, it brings forth both benefits and drawbacks. The research aimed to explore relation among AI and the decline in human decision-making, increased laziness, and heightened concerns regarding privacy and safety. Results presented in Tables I and II reveal favourable association between AI and these elements. Thus results align towards previous research, as evidenced by similar outcomes documented in studies by Bartoletti, Ivana. (2019), Saura et al. (2022), and Bartneck et al. (2021).

The use of AI as a new norm in software industry raises potential privacy and security concerns for both employees and the organisations. Effectively leveraging AI technology requires specialized expertise and knowledge. Insufficient understanding of its deployment may result in privacy and security vulnerabilities (Vazhayil and Shetty, 2019). Establishments are often short of requisite technical proficiency in AI to efficiently manage these applications proficiently, rendering them susceptible to privacy and security breaches. Despite the presence of proficient AI administrators and trained users, it's crucial to acknowledge the potential for errors, which could precipitate significant security and privacy hazards.

AI relies on programs and vast database to automate operations; however, flaws within these programmes can lead to serious consequences. Unlike humans, AI systems can replicate the same errors in decision-making, posing significant risks to the security and privacy of institutional and employee data. Employees may find themselves vulnerable due to a lack of comprehensive AI learning (Asaro, 2019). With a growing count of clients and varying proficiency, concerns regarding privacy and safety get escalate (Lv and Singh, 2020). The impact of such instances vary based on the variation and criticality of the security breach, as well as how the attackers exploit leaked or compromised data (Vassileva, 2008).

The results of this research reinforce the hypothesis that human decision-making abilities may diminish over time due to an increasing dependence on artificial intelligence. The findings indicate that AI does, in fact significantly contribute to the decline in human ability to make decision. Recent studies conducted by other researchers have underscored Artificial Intelligence as a principle factor contributing to the gradual deterioration of individuals' ability to make decision. Artificial Intelligence (AI) systems excel at automating repetitive tasks, thereby reducing the necessity for human involvement in cognitive processes, memory utilization, and analytical reasoning. The research suggests a potential weakening of individual decision-making abilities. (Nikita, 2023).

Conclusion

Ensuring data security and privacy in the utilization of AI by software professionals is paramount. Implementation of robust encryption during data transmission and storage, strict access controls, and multi-factor authentication are crucial to prevent unauthorized access. Data minimization principles, anonymization, and pseudonymization techniques help to limit the exposure of sensitive information. A robust security framework can be achieved through the implementation of secure model training environments, consistent security assessments, and ensuring compliance with data protection regulations like GDPR(General Data Protection Regulation). Privacy impact assessments, the use of secure APIs, and fostering user education on data handling practices further fortify the protection of sensitive information. By adopting these measures, software professionals contribute to build a trustworthy and privacy-conscious environment in the realm of AI applications.

Recommendation

1. Enhance AI Training Programs: Conducting AI training programs, for end users to improve their knowledge in AI technologies and their applications. These programs should focus not only on technical aspects but also on ethical considerations, security protocols, and decision-making frameworks.
2. Implement Robust Security Measures: Prioritize cybersecurity by implementing robust security measures across AI systems and software platforms, that includes encryption, authentication controls, frequents security checks, and proactive threat detection mechanisms to prevent data breaches and unauthorized access.
3. Promote Human-AI Collaboration: Foster a culture of synergic environment between humans and AI systems. Promote employees to work along with AI tools rather than relying solely on automation. This approach ensures that human decision-making skills are retained while leveraging the efficiency and accuracy of AI algorithms.
4. Provide Decision-Support Systems: Develop AI-powered decision-support systems that assist employees in making informed decisions rather than replacing human judgment entirely. These systems

should provide recommendations based on data analysis while allowing employees to evaluate options and make the final decision.

5. Encourage Continuous Learning: Encourage continuous learning and skill development among employees to adapt for evolving AI technologies. Offer opportunities for training, workshops, and certifications to keep employees updated on the latest advancements and best practices in AI.
6. Address Employee Concerns: Proactively address employee concerns about job displacement or loss of control due to AI implementation. Provide transparency about the purpose and functionality of AI systems, and involve employees in decision-making processes related to AI integration.
7. Promote Work-Life Balance: Combat human laziness by encouraging a balanced work-life balance and develop a peaceful work environment. Encourage regular breaks, physical activity, and mental wellness initiatives to prevent burnout and maintain employee motivation and productivity.
8. Ethical AI Development: Prioritize ethical considerations in AI build and implementation. Make sure that AI systems are devised to respect privacy, fairness, and transparency, and avoid biases or discrimination in decision-making processes.

By incorporating these strategies, organizations can harness the benefits of AI technology in the software field while mitigating potential risks and preserving the integrity of human decision-making skills and employee well-being.

Further research in the realm of improving AI in the software field without compromising security, decision-making skills, and human motivation among employees presents numerous promising avenues. Investigating the long-term effects of AI integration on these factors can provide valuable insights into how organizations can adapt to technological advancements while maintaining a secure and productive work environment. Ethical considerations in AI development also offer fertile ground for exploration, particularly regarding the development of ethical frameworks and guidelines for AI deployment. Delving deeper into human-AI interaction dynamics within software development teams can shed light on how AI tools influence teamwork, communication, and decision-making processes. Moreover, research focusing on the efficacy of AI-driven security solutions, innovative training approaches for employees, and the impact of AI on workforce dynamics across different cultural contexts can further advance our understanding of AI's role in shaping the future of the software industry. Additionally, exploring policy and regulatory frameworks governing AI adoption can help to inform policymakers and organizational leaders on the best practices for responsible AI implementation. By addressing these research areas, scholars can contribute to maximize the benefits of AI technology while minimizing potential risks and ensuring the well-being and productivity of employees in the software field.

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