



Artificial Intelligent Opportunities for Creativity and Innovation of Future Radio Translators

Harliantara

Dr. Soetomo University, Indonesia

Email: harliantara@unitomo.ac.id

ABSTRACT

Radio broadcasting is an industry where creativity and innovation can be significantly influenced by Artificial Intelligence (AI), which can generate many ideas quickly, help the design process and inspire human creativity. This research aims to acquire factual knowledge revealing the important aspects that arise in Artificial Intelligence (AI). This research uses a qualitative descriptive method with a literature study approach. The findings show that AI can assist in content creation, listener preference analysis, and broadcast schedule optimization. It is important to note that AI cannot replace human wisdom and creativity, but can be used as a tool to enhance and complement human capabilities, making content creation and broadcasting more efficient and successful.

Keywords: Artificial Intelligence, Radio Broadcasting, Radio Broadcaster, Radio Programs

INTRODUCTION

Digital thinking involves solving problems using algorithms to tackle complex issues and exploring how data algorithms and AI can create new opportunities in a technology-intensive world. Logical Thinking Skills and Digital Literacy significantly influence internship performance (Imjai et al., 2024). Deep neural networks have substantially advanced AI research, with the potential to transform civilization (Brinkhaus et al., 2023). This mind-set embraces innovation, experimentation, and the use of digital tools to solve complex problems. When combined, digital thinking and design thinking can yield powerful, creative, efficient, and impactful solutions. The term "Internet of Things" (IoT) refers to information collected from various devices serving end users (Liu et al., 2023). Digital benefits in radio broadcasting include unlimited choice, improved sound quality, global accessibility, advertising control, economic value, data-driven insights, and capabilities that allow advertisers to connect to radio satellites quickly and effectively, engaging the target audience (Salonen et al., 2024).

Human-operated transmission has a rich history, from the golden age of radio in the United States (late 1920s to early 1950s) to the 1980s in Indonesia (Mooney, 2015). Millions of listeners enjoyed diverse broadcasts ranging from humour, theatre, quizzes, talk shows, song requests, to essential news programs. Radio remains popular, competing with other technologies to attract and retain audiences.

AI, a technology enabling machines, particularly computer systems, to mimic human intellectual functions, is recognized by manufacturing companies for its potential (Yamamoto et al., 2024). AI systems operate by consuming large amounts of label data, checking for correlations and patterns to predict future conditions. Businesses increasingly use AI to assess and solve complex problems (Armenia et al., 2024). Artificial intelligence has many uses in a variety of fields, including radio as a media, entertainment. Natural Language Processing (NLP), Robotic Process Automation (RPA), also, as far as we know, the first to use dose optimization, machine learning, and computational models derived from MRIs to optimize the chance of a treatment response at the individual level based on the working memory performance of the responders' group as previously examined (Albizu et al., 2023). Machine Learning and Cognitive Computing are some examples of Artificial Intelligence technologies (AI).

AI is used to create content, identify patterns, automate processes, and enhance products and services. Integrating AI like ChatGPT into daily operations will significantly transform the business landscape, especially in marketing (Hussain et al., 2024). While technology can revolutionize business, concerns about ethical, privacy, and employment issues persist. In today's rapidly evolving business environment, radio broadcasting needs innovative AI-supported solutions. AI offers great potential for various applications and benefits in the workplace, particularly in human-AI collaboration with Artificial intelligence (IA) can enhance human creativity. AI technology can evaluate and select ideas based on survival and impact, perform predictive analysis, and assess market conditions. The integration of AI-powered algorithms in organizational management necessitates human-centered AI management studies to understand human reactions to robot control (Dong et al., 2024). In this case, it can create simpler procedures, better output quality, and continuous improvements that are all necessary for radio broadcasting innovation.

Artificial Intelligence (AI) can be used in radio broadcasting settings to find patterns in large data settings, generate new concepts, and evaluate radio survival and possible impact. In addition, it can offer insights into consumer demand and industry trends, which can guide future progress and drive innovation (Gao, 2024). To investigate consumer views of basic and advanced virtual agent usage intents, a conceptual framework was created (Payne & O'Brien, 2024). Radio broadcasting can gain advantage in performing various tasks by leveraging the processing power and enormous predictive analytical capabilities of radio broadcasts, which will ultimately lead to more effective and efficient innovation. Radio operators are not yet convinced that digital thinking is necessary to build a digital radio broadcasting ecosystem that has the power of data as a digital characteristic as a solution. It is a set of guidelines that guide solutions to rapid technological developments and changes. Smart digital technology has been implemented in the educational system at an exponential rate during the last few years. This has brought about new opportunities, problems, and difficulties in modern society (Mhlongo et al., 2023).

Not all radio broadcasters understand the benefits of digital. Digital technology has many advantages and is widely used in many aspects of life (Masiero et al., 2024). But not everyone realizes or appreciates these advantages. Among the advantages are equalizer of information access, easier communication, and more practical service virtualization. Digital technology offers equal information access, easier communication, and practical service virtualization, making it accessible to media and entertainment consumers, especially in radio broadcasting. Adopting workplace technology and fostering digital learning among broadcasters can create supportive communities benefiting from technology (Grewal et al., 2023). The term "digital economy" describes the economic activity that results from using digital

technology to connect people, companies, devices, data, and operations. Online transactions across several industries and technologies are encompassed, including big data, mobile, Internet, and information and communications technology (Javaid et al., 2024). Despite these advantages, there is still a significant problem known as a "digital disability", in which many people around the world do not have access to digital technology and the Internet, which can lead to social isolation and poverty. It would therefore be crucial to understand and solve problems if we were to hope to guarantee that everyone can take advantage of digital technology (Grewal et al., 2023).

Developing an innovative radio program requires imagination. Creating innovative content requires more complex thinking when engaging listeners (Olek, 2023). It can involve experimenting with new topics, styles, and points of view, as well as bringing new concepts and perspectives to existing programming. As with previous technological revolutions, such as the diffusion of ICTs in the last decades of the past century, artificial intelligence displays remarkable and pervasive impacts across firms, industries, economies, and societies (Damioli et al., 2024). Besides, broadcasters can remain relevant and attractive by using creativity to adapt to changing audience tastes based on technological developments. There are exciting opportunities for (AI) in business and the global economy. (Mikalef et al., 2023) There is a lot of potential in the notion that AI and machine learning in particular, would eventually match or surpass human performance, assume job functions, radically alter the operational basis of businesses, and upend management methods. As evidenced by the fact that half of those dealing with Artificial Intelligence (AI) do not even acknowledge that they have done so, not many people are familiar with using it while technology continues to evolve based on computing and the Internet that is now widely used by society.

To use Artificial Intelligence (AI) radio innovation, IT staff is essential. Radio station organizations can enhance their human resource competencies by making better decisions by integrating Artificial Intelligence (AI) into the radio station strategy. Additionally, AI Applications that enable the automation of numerous manual procedures have been proposed; they can help reduce bottlenecks and improve operational efficiency in B2B operations (Mikalef et al., 2023). Artificial intelligence (IA) can be integrated into several radio station jobs, including performance evaluation, on boarding, and training. In addition, it can help with scheduling, content creation, and even content distribution performance on a variety of digital media.

To reduce the gaps that exist to improve the understanding of digital literacy or digital thinking then in addition to practice also digital literature training is required (Zhang et al., 2023). These skills include basic computer skills including knowing how to use software programs such as text processors and spread sheets, as well as how to operate computers and navigate the operating system. Then do the Internet browsing experience of navigating the Internet successfully, including using search engines, understanding the function of hyperlinks, and controlling several tabs and windows. Also, the ability to critically evaluate and generate media content, including audio, video, and image files, is known as media literacy. Understanding is made possible by knowledge, and user knowledge is non-existent. An interactive computer system has restricted access to user data, making the task of user model collection challenging.

Enhance expertise in sending, receiving, and managing emails known as email management. Knowing how to use social media platforms for collaboration and communication is known as social media skills. expertise in podcasting: the ability to subscribe, watch, and even generate podcasts (Dobbe et al., 2021). E-commerce is the ability to shop online safely and successfully, including determining the legitimacy of an e-commerce site and understanding secure payment methods. Skill in digital video editing, including using programs such as Adobe Premiere Pro or iMovie. Understanding how to access, interact with, and generate live streams is known as "live stream literacy." the ability to browse the internet on your own and collect data. Understanding, evaluating, producing, and engaging with a variety of media - text, photo, audio, video, and online social platforms - is known as media skills (Masiero et al., 2024). Collaborate with people in an online setting in an efficient way. Knowledge of popular jargons and platforms: awareness of phrases and instruments used in digital environments. Communication, using digital tools for professional and efficient communication.

These skills are vital to developing in the digital age and are becoming increasingly significant for personal and professional purposes including the interests of organizations or institutions where you work. However, integrating Artificial Intelligence (AI) into radio programming would require trifacta of information and technology (IT) knowledge, data analysis skills, and knowledge of the radio industry (Sompie et al., 2024). The human resources department must ensure that the resources and expertise necessary to support the innovation process are available. To solve the knowledge gap in digital broadcasting technology, training is needed (Dobbe et al., 2021). There are several sites available for radio that offers AI technology training. "AI Broadcast Radio: Making Sound Waves" is a workshop offered by Future Media Concepts especially for radio professionals.

To reduce the gap competition of human resources radio is rarely held. Even if there is indeed done internally by the radio station itself to sunbreak empowerment of competence. The integration of Artificial Intelligence (AI) into radio frequency (RF) and wireless systems is made possible by Deep wave Digital's integrated hardware and software solutions. Machine Learning (ML) applications and Artificial Intelligence (AI) technologies can boost the production of radio programmers. These tools can improve audio quality, speed up processes, and open new job opportunities in radio sound production (Olek, 2023).

RESEARCH METHODS

This research uses a qualitative descriptive method. This method involves collecting and analyzing non-numerical data to understand concepts, opinions, or experiences. In this context, a literature study approach was used, which means the researcher collected information from various existing written sources, such as books, journal articles, and other publications relevant to the topic.

RESULTS AND DISCUSSION

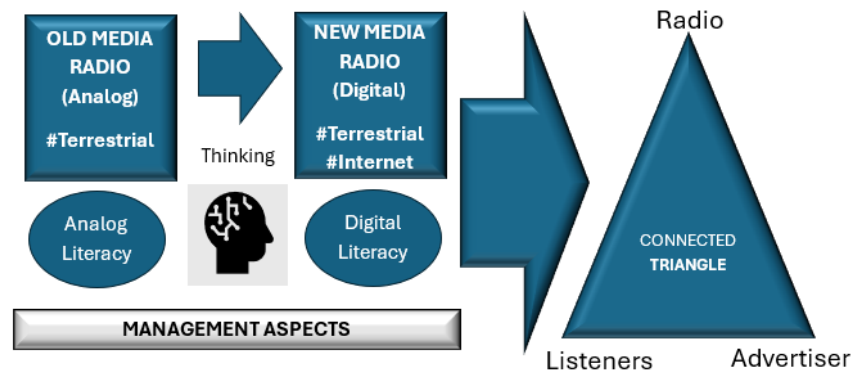


Figure 1: Changing the way, you think about analogue to digital data management.

Everyone involved in broadcasting managers should have a “digital mindset” to help individuals and groups recognize how data, algorithms, and Artificial Intelligence (AI) provide new opportunities and maps how to serve today’s customers (listeners and advertisers) that depend on technology (Miller, 2019). It should have an open mind to experiment with innovative technologies with an approach to customer interaction in addition to putting the customer experience. Ideation, prototyping, and testing are another component of digital thinking that helps provide creative solutions that meet customer needs.

Open thinking about the importance of digital thinking Opening is a key component of innovation and the efficient use of digital technology and is intricately linked to the significance of the digital thinking. The technological, economic, and social aspects of openness include user access at competitive prices, open standards for basic technologies and protocols, and respect for privacy, freedom of speech, and human rights. Transparency enables people to use digital technology more widely and perform more tasks, such as launching an online business, developing new goods and procedures, expressing opinions, gaining funds, exchanging ideas and expertise, conducting research, and interacting with governments. When it comes to digital thinking, transparency is essential to creating a culture that values truth, challenges assumptions, and demands evidence. Advanced robotics presents new policy and ethical problems.

Fact verification and critical thinking are essential skills to navigate the digital world, where information is widely available but not always accurate or dependable. By including media literacy and information evaluation in their curricula, educational institutions play a key role in developing these skills and gives robots an innate desire to learn, retain, and apply new skills. Furthermore, it has been found that openness to experience - personality traits characterized by a willingness to be unique, complicated, creative, and accept innovative ideas - plays a role in creative thinking. However, openness to experience and intelligence do not have a clear correlation because both characteristics are not the same and their interactions do not always indicate original thinking. Openness plays a key role in the importance of digital thinking as it promotes innovation, a culture of fact-checking and critical thinking, and can even trigger creative thinking and the notion of inversely projecting the mental realm into a metric space to facilitate human cognitive processes like externalization and idea generation.

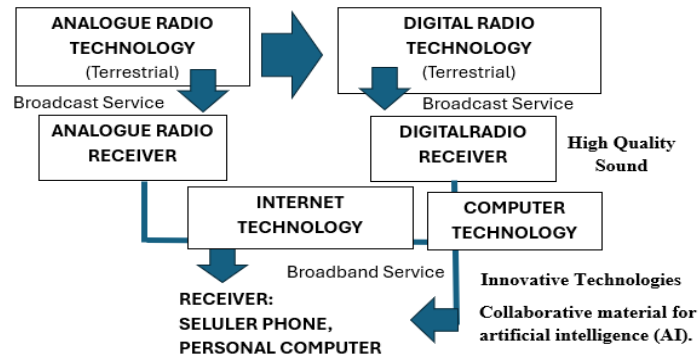


Figure 2: Changing the way, you think about analogue to digital data management

Learning about the development of broadcasting technology can lead to changes in various aspects of society and during the technology transfer process. For example, the evolution of radio, which has made radio superior by introducing innovative technologies such as from analog terrestrial AM to FM radio, preparation towards digital terrestrial and integration with the internet, which expands the range of programs with better sound quality that can be heard by the audience. And there has been a lot of work in recent years utilizing semi-structured and collaborative material for artificial intelligence (AI). In addition, the shift from electronic radio to Internet radio that has evolved since the early 2000s has paved the way for high-quality sound and digital applications. These technological advancements not only enhance the listener experience, but also influence the way people consume media and interact with each other.

Technological innovations that can be used to improve the caliber of broadcast services can be found through research in broadcasting technology. For example, more standardized definition transmission and better image quality are possible by switching from analogue radio to digital radio. It shows how monitoring progress in broadcasting technology can help broadcasters improve the services they offer, which in turn benefits consumers. In addition, by knowing the background and developments of broadcasting technology, innovations and future advances can be informed, ensuring that the broadcast continues to be a dynamic and responsive media that meets the demands and expectations of the audience.



Figure 3: To improve the radio industry's human resources' readiness for the age of digital broadcasting.

Adopt digital platforms, use data analytics for personalization, and promote interactive experiences to embrace the digital transition of radio. Understanding the ubiquity and data explosion that digital broadcasting brings can help reshape radio and open new revenue streams and audiences. Adopt digital platforms, use data analytics for personalization, and promote interactive experiences to embrace the digital transition of radio. Understanding the ubiquity and data explosion that digital broadcasting brings can help reshape radio and open new revenue streams and audiences. In order to promote diversity and inclusivity in the media and to build cross-cultural relationships, radio broadcasters should strive to access a worldwide talent pool. This can be accomplished by accepting the global reach of Internet radio, which enables connections and the sharing of music and content between listeners from various cultural backgrounds. Use user-generated content, interactive components, and visuals to improve the listening experience and foster a sense of community. This can support preserving the genuineness and human element that radio listeners cherish in programs. Take up environmental issues and promote programming variety. This promotes a conscientious business strategy and enhances the general caliber and pertinence of radio programming. To be competitive in these digital times, arm radio management and staff with modern multi-media and social media skills. This can assist radio stations in navigating the opportunities and challenges brought about by digital transmission. Promote a culture of ongoing education and growth in the radio industry. By staying current with emerging trends and technology, radio professionals can better prepare themselves for the opportunities and challenges presented by the digital era.

A new wave of potent and revolutionary Web apps has emerged because of social computing on the Internet. We contend, however, that the era of "social machines" is only getting started and that Web and AI researchers must work together to ensure their continuous development and expansion. Human Resources competence in the broadcasting media sector needs to be enhanced in accordance with the functions of the radio broadcaster by training and developing the talents it has. In the broadcasters, the human resources department of the media company needs to nurture, and maintain, superior talents to succeed. It needs to quickly detect employees' talents, stay informed about new developments in the field and trends, as well as give employees the opportunity to undertake training so that they can advance their careers and perform better. It is included in cognitive science and psychology as well. It focuses on the phenomena that arise when computers carry out tasks that are considered to require intelligence—thinking—if they were carried out by humans. (Simon, 1995) In addition, the human resources department must ensure that its employees can take advantage of opportunities for professional growth, such as attending conferences, workshops, or other industrial events. There will be human-level AI, but it will probably take some time to develop new concepts, so a precise timeline is impossible to determine—it could take five years, five centuries, or even longer. My inclination is to wager on the 21st century. For the human resources of radio to compete in the digital era, their skills need to be improved. Radio infrastructure has undergone a paradigm shift by shifting from analogue to digital broadcasting, providing better audio quality, wider coverage, and improved reception. In addition, multimedia content – such as text and images – can be integrated into digital broadcasts, improving the listening experience for the audience. Radio broadcasters must stay up to date with the latest advances in radio infrastructure to meet the challenges of this 21st century. These innovations include higher audio quality, larger data capacity, and Artificial Intelligence (AI) integration for voice-enabled content control and development. Radio broadcasters also must pass regulatory barriers and obtain the necessary licenses to use modern technologies.

As the new Artificial Intelligence (AI) application for operational radio programming runs automatically through machines, it is necessary to design and implement AI DJs in which various information devices work together to support program activities. In this case, allowing the process of interaction with listeners or advertisers can be done in the form of an AI service. In addition to the office tasks commonly performed by humans can be served by an AI application for the marketing service process of a radio station in addition to broadcasting programs carried out by the AI Broadcaster. Where the preparation of the digital era in the future radio station broadcasts and the negotiation of publicity could be done without the involvement of humans but involving human assistant systems through the collaboration of agents and the new insight done by AI for the operational function of the radio broadcast. (Valdés-Pérez, 1999)

Radio operations in the future, indeed, are applications that are generally exactly the functional computer systems used only in simple aspects of keeping out of critical control circles and replacing previous mechanical or analog devices. But gradually must accept artificial intelligence trying to build more sophisticated (AI) systems; techniques, organizational software used included for tasks of overseeing and controlling the production of programs or creative content is as a process.(Garcia et al., 2013) As these automated applications of radio broadcasting become more and more sophisticated, so the knowledge that has to be enhanced this in turn leads to simultaneous growth in the size and complexity of the radio broadcaster industry with computer systems. Now, software solutions for AI systems engineering applications today seem to be the thinking of radio operators to look for new breakthroughs in the adaptation of increasingly sophisticated technology and information developments. The role of distributed computer systems in radio broadcasting is growing, therefore it's critical to think about how to make these machines operate together well, especially when those interactions are intended to support regular tasks. (Zlotkin & Rosenschein, 1996)

A developing trend in the radio industry is the application of creativity and innovation in radio programming, merging AI technology with controlled radio programmers run by human and machine broadcasters. Artificial intelligence (AI)-based solutions are being created and deployed to automate and improve radio production. As for some of the ongoing developments in the world of radio broadcasting related to AI, for example: Waymark offers a scalable subscription-based service for radio clients, including Morgan Murphy Media, Beasley Media Group, and Alpha Media Group. Their Voicetrack.ai tool allows for fully automated AI-supported operations of 24/7 channels or complete radio shows. Using AI, Radio Workflow is a web-based traffic platform that produces creative aspects for ad production, such as voiceovers, production music, sound effects, script writing, and voice cloning and generation. With the help of World Cast Systems' Smart FM technology, broadcasters may reduce their FM transmission energy consumption by up to 40% by dynamically adjusting the RF output power in accordance with the material being broadcast. Generative AI models are used by ENCO SPECai to generate audio material, automate voice tracking, and make commercials for radio and television. (<https://www.radioworld.com/tech-and-gear/products/10-ai-based-tools-for-radio>)

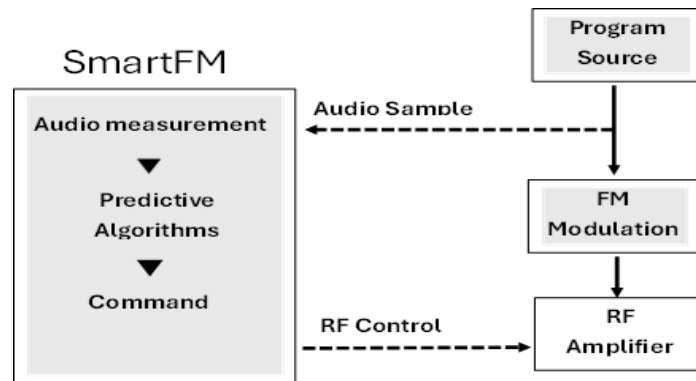


Figure 4: World Cast System

<https://www.radioworld.com/tech-and-gear/products/10-ai-based-tools-for-radio>

Super Hi-Fi's Program Director is an AI-powered operating system for broadcast radio and digital audio, designed to function as a support system for overworked programmers. Futuri Media's RadioGPT is billed as the world's first AI-driven localized radio content solution, combining the power of GPT-3 technology with AI-driven targeted story discovery and social content system, Topic Pulse, and AI-generated voices (https://www.insideradio.com/free/super-hi-fi-cues-up-ai-powered-operating-system-for-radio/article_22ff760a-d82c-11ed-823b-9f510d56a953.html)

These tools and platforms are being used to enhance radio production, automate tasks, and create more personalized and engaging experiences for listeners. However, there are also concerns about the potential for AI to replace human radio hosts and the impact on jobs in the industry. (<https://radio.co/blog/ai-radio-pros-cons>)

CONCLUSION

Digital literacy is the ability to understand and use information in a variety of formats, which can help people participate in the modern world. Digital literacy plays an important role in contemporary society as it increases the desire to learn, promotes the development of critical and creative digital literacy. The basic principles of digital intelligence include critical thinking, empathy, and self-awareness. To engage in modern society, understanding digital literacy is essential, just like understanding other subjects. Broadcasting technology has been constantly evolving over the years, with remarkable breakthroughs made. To make sure they provide the best service to the listeners. Radio management must be aware of the technological advances that are accessible to deliver exciting broadcasting programs in the digital age. Broadcasting radio managers should be aware that the future of radio depends on digital change to increase customer satisfaction both listeners and advertisers. Besides, it should increase efficiency by integrating digital technology into current radio operations and promptly transform into digital broadcasting by combining human and technological elements. The human resources department should also ensure that digital literacy is updated and plans for change management should be made to ensure that the digital transformation strategy fits the overall goals of the organization.

That a radio show with Artificial Intelligence (AI) technology, will facilitate the creation of content quickly for several platforms. This technology has an advantage over conventional radio stations in that it can quickly produce programs with multiple channels and post them on social media. Future radio programs must be imaginative and creative to compete in a media landscape dominated by podcasts,

streaming services, and customized playlists. Radio needs to be transformed into digital, using technology to improve programming and broadcasting operations, for example, algorithms supported by Artificial Intelligence (AI), providing access to a variety of content on demand and automation with Artificial Intelligence (AI) technology, making radio more relevant and exciting in the present and future. Broadcasters can use artificial intelligence technology and streaming to strengthen ties with audiences.

BIBLIOGRAPHY

- Albizu, A., Indahlastari, A., Huang, Z., Waner, J., Stolte, S. E., Fang, R., & Woods, A. J. (2023). Machine-learning defined precision tDCS for improving cognitive function. *Brain Stimulation, 16*(3), 969–974.
- Armenia, S., Franco, E., Iandolo, F., Maielli, G., & Vito, P. (2024). Zooming in and out the landscape: Artificial intelligence and system dynamics in business and management. *Technological Forecasting and Social Change, 200*, 123131.
- Brinkhaus, H. O., Rajan, K., Schaub, J., Zielesny, A., & Steinbeck, C. (2023). Open data and algorithms for open science in AI-driven molecular informatics. *Current Opinion in Structural Biology, 79*, 102542.
- Damioli, G., Van Roy, V., Vértesy, D., & Vivarelli, M. (2024). Drivers of employment dynamics of AI innovators. *Technological Forecasting and Social Change, 201*, 123249.
- Dobbe, R., Gilbert, T. K., & Mintz, Y. (2021). Hard choices in artificial intelligence. *Artificial Intelligence, 300*, 103555.
- Dong, M., Bonnefon, J.-F., & Rahwan, I. (2024). Toward human-centered AI management: Methodological challenges and future directions. *Technovation, 131*, 102953.
- Gao, Y. (2024). Design of urban innovation space system using artificial intelligence technology and internet of things. *Heliyon, 10*(3).
- Grewal, D., Benoit, S., Noble, S. M., Guha, A., Ahlbom, C.-P., & Nordfält, J. (2023). Leveraging In-Store Technology and AI: Increasing Customer and Employee Efficiency and Enhancing their Experiences. *Journal of Retailing*.
- Hussain, K., Khan, M. L., & Malik, A. (2024). Exploring audience engagement with ChatGPT-related content on YouTube: Implications for content creators and AI tool developers. *Digital Business, 4*(1), 100071.
- Javaid, M., Haleem, A., Singh, R. P., & Sinha, A. K. (2024). Digital economy to improve the culture of industry 4.0: A study on features, implementation and challenges. *Green Technologies and Sustainability, 100083*.
- Liu, J., Wen, J., Zhang, B., Dong, S., Tang, B., & Yu, Y. (2023). A post quantum secure multi-party collaborative signature with deterability in the Industrial Internet of Things. *Future Generation Computer Systems, 141*, 663–676.
- Masiero, S., Qosaj, J., & Cutrona, V. (2024). Digital Datasheet model: enhancing value of AI digital platforms. *Procedia Computer Science, 232*, 149–158.
- Mhlongo, S., Mbatha, K., Ramatsetse, B., & Dlamini, R. (2023). Challenges, opportunities, and prospects of adopting and using smart digital technologies in learning environments: An iterative review. *Heliyon*.

- Mikalef, P., Islam, N., Parida, V., Singh, H., & Altwaijry, N. (2023). Artificial intelligence (AI) competencies for organizational performance: A B2B marketing capabilities perspective. *Journal of Business Research*, 164, 113998.
- Miller, T. (2019). Explanation in artificial intelligence: Insights from the social sciences. *Artificial Intelligence*, 267, 1–38.
- Mooney, G. (2015). Washington and Welch Talk About Race Public Health, History, and the Politics of Exclusion. *American Journal of Public Health*, 105(7), 1317–1328.
- Olek, K. (2023). Startups and Lean Startup approach in building innovative companies creating unique market values—theoretical considerations. *Procedia Computer Science*, 225, 3745–3753.
- Payne, E. H. M., & O'Brien, C. A. (2024). The search for AI value: The role of complexity in human-AI engagement in the financial industry. *Computers in Human Behavior: Artificial Humans*, 2(1), 100050.
- Salonen, A., Mero, J., Munnukka, J., Zimmer, M., & Karjaluoto, H. (2024). Digital content marketing on social media along the B2B customer journey: The effect of timely content delivery on customer engagement. *Industrial Marketing Management*, 118, 12–26.
- Sompie, D. J., Mulyanadi, D., & Maella, N. F. S. (2024). The Impact of Digital Literacy in Digital Radio Transformation at Indonesia. *Kurdish Studies*, 12(2), 5301–5314.
- Yamamoto, Y., Muñoz, A. A., & Sandström, K. (2024). Practical Aspects of Designing a Human-centred AI System in Manufacturing. *Procedia Computer Science*, 232, 2626–2638.
- Zhang, H., Xiang, Z., & Yin, J. (2023). Social intimacy and skewed love: A study of the attachment relationship between internet group young users and a digital human. *Computers in Human Behavior: Artificial Humans*, 1(2), 100019.
-

Copyright holder:

Authors (2024)

First publication rights:

[Syntax Transformation Journal](#)

This article is licensed under:

