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CONTEMPORARY LEADERSHIP PRACTICE AND CHALLENGES IN HIGH-TECH ERA OF 21ST CENTURY

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ABSTRACT

Humans seek meaning of life in the metrics of happiness in worldly activities, and happiness is more concerned in our feelings in the present and related to our satisfaction in general.Future leaders will face new challenges like 4th industrial revolution and smart technology in the workplace in 21st century. The difficulties face by contemporary leadership and will face in future generation to manage and expand their venture in a different way in this century. Leaders will mitigate challenges during the next decade that neither present nor previous leaders have encountered. Leaders of the future cannot afford to run their companies solely by following established procedures. They must futuristically move their organizations into the future. It is a complicated taskanyway. Todayextensive use of smart technology is making workplace and leadership environment more challenging. Contemporaryleaders must be aware of advanced/smart technology and have the flexibility to shift their perspectives to comprehend what recent advancements are most crucial and what is in the works. The abilities and traits needed to successfully manage a team or workforce both now and in the future are embodied by a contemporary leaders. This paper will investigate a thorough assessment of contemporary leadership practices and the challenges of operating in 21st century where cutting-edge technology is vital. Considering toxicity in workplace.

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INTRODUCTION

Human life is a lovely journey that is meant to be embraced to the fullest every moment. Technology deeply impacts all facets of human life, altering how modern leaders communicate, handle daily operations, and function within their organizations. Effectively utilizing technology and embracing a modern lifestyle are now vital for leadership in today's fast-changing world. By harnessing technological innovations, leaders can enhance productivity, maintain competitiveness, stimulate innovation, and make better-informed decisions. Globally, top executives acknowledge the crucial role of technology in personnel management, aiding team building and tracking work across various channels and international offices. As globalization and technology advances, traditional workplaces are becoming less conventional. Additionally, workplace toxicity has emerged as a significant problem, potentially reducing employee productivity and organizational success. To succeed, leaders today must adopt a modern management stylebeing flexible, adaptable, and open to new ideas and strategies. Some believe that traditional leadership still has relevance and can be integrated with contemporary methods. In this tech-driven era, characterized by rapid growth and shifting demands, modern leadership may be more effective.[1] This overview offers a comprehensive assessment of toxic workplaces, leadership challenges, and new leadership practices in this technological age.[2] Before deploying any technology-based initiative, leaders should verify that it meets three essential criteria: technical feasibility, financial viability, and legal compliance acceptability. Technical feasibility, financial viability, and legal acceptability are the three important factors that a leader must verify their plan meets before adopting any technology-driven endeavor. A leader has to think about the technical feasibility of the idea by seeing if it fits in with what the company already has in place. To ascertain the feasibility of the plan's implementation, a comprehensive technical evaluation must be carried out. Finding out whether it can be funded is the next step. The expenses of implementing technology must be considered by leaders.The development of technology and its effects on society are evidence of the remarkable human capacity for innovation. A leader's ability to incorporate the revolutionary potential of technology into their decision-making hinges on their awareness with this development. The wheel's revolutionary impact on transportation and trade has been crucial in the expansion of civilizations. Extending their empires, the rulers of that time took use of this technological innovation that was both simple and strong. Manufacturing and transportation were both revolutionized by the

[1] Gunderman R.B., (2019), How neglect fosters workplace toxicity, J. Am. Coll. Radiol. 2019; 16:252–254, accessed on 21 Oct 2025

[2] Hossain K. A., (2025a), ASSESSMENT OF GLOBAL GREAT ENTREPRENEURS' LIFE: LESSON FOR NEW ENTREPRENEURS FOR SUCCESS IN 21ST CENTURY, Norwegian Journal of development of the International Science No 167/2025, Available from: https://doi.org/10.5281/ zenodo.17492594, accessed on 10 Feb 2026

development of the steam engine, which sparked the revolution in manufacturing. Revolutionary leaders like James Watt used this technology to propel society forward and shake up whole industries. Innovation moved at a breakneck speed with the rise of computers and the Internet.4By simplifying operations, enhancing communication, and increasing market reach, leaders gain a competitive edge through embracing digitalization. Thanks to artificial intelligence (AI), machine learning (ML), deep learning (DL), the Internet of Things (IoT), blockchain, and predictive analysis, automation, big data, and data-driven decision-making are accessible to today's savvy and modern executives' data. There are a lot of areas of life, businesses, and industries that can profit from these cutting-edge technologies. The positive effects of utilizing the technology are gaining momentum across many industries. A smart and digital revolution is being guided in by technology.[3] Contemporary leaders need to keep up with technological advancements. In any case, they won't be able to link up and put his leadership into action at a worldwide pace. The revolutionary potential of AI and robots in automating jobs, boosting decision-making, and streamlining procedures are set to disrupt the workplace over the next decade. By analyzing massive amounts of data, finding trends and patterns, and making remarkably accurate predictions, AI-powered products can be truly extraordinary. Efficiency, cost-effectiveness, accuracy, data-support concept, and competitiveness can all be enhanced when leaders make choices based on information. In addition, AI has the ability to automate mundane jobs, allowing both men and subordinates more time to concentrate on higher-level, more creative endeavors.

Leadership is the capacity to express a vision, adopt the principles of that vision, and cultivate an atmosphere in which all individuals can achieve the organization's objectives and their own personal requirements. Organizational leaders are typically defined as individuals who possess command, position,control, governance and authority at the highest echelons of an organization. Nevertheless, this is entirely inaccurate. They are the individuals who motivate and inspire others with their behavior, style, and abilities. Modern leaders are surrounded by individuals that share their passion, drive, and thought process.[4] They have genuine following, team members, and lovers; nonetheless, they are not motivated by fame or popularity. Their vision and objectives are evident, and they were implemented without the necessity of obtaining special privileges, rights, or positions. Modern leadership is not contingent upon one's status or position. Typically, they remain as a top executive who oversees the subordinates are compelled to adhere, even if their views and vision are in stark opposition. Contemporary leaders do not require any particular tie or connection to a position or social status in order to influence and persuade individuals to believe in them. The term "organizational toxicity" (OT) describes an environment where workers are unhappy and have issues, which in turn lowers their interest in and dedication to their work.[5] Both individuals and organizations are badly affected by organizational toxicity, which is a major issue in today's workplaces. Organizational toxicity creates harmful working conditions that negatively affect employees' physical and mental health, leading to issues like depression and burnout. Therefore, it is clear that organizational toxicity is harmful to workers and may jeopardize businesses' viability.[6] Because they fear rejection or criticism, employees in a lethal work place may be hesitant to express themselves, voice problems, or share ideas. Racism, dishonesty, and broken promises are just some of the unethical behaviors that can flourish in a hostile work environment.[7]Leadership is based on building relationships, and toxic work environments affect employees at all levels, from entry-level workers to high executives.[8] When a disease has spread throughout an entire organizational structure, removing the diseased head won't solve the problem. The initial stage in enhancing a culture is identifying its poisonous components. Leaders will waste time and energy trying to fix every part of company culture that some workers find annoying. On the contrary, they ought to zero in on the fundamental problems that make workers miserable to the point where they disengage, criticize, and eventually leave.[9]

Leadership has always been challenging, and upcoming leaders will confront new obstacles like the 4th industrial revolution and smart workplaces technology. These demands require upcoming leaders to manage and grow their ventures differently in this tech-driven age. Over the next decade, they will confront problems that neither current nor past leaders have experienced. Relying solely on traditional methods is no longer enough; they must actively guide their organizations forward. This is difficult, as rapid technological progress often renders current knowledge obsolete quickly through better innovations. Leaders need to understand advanced or smart technologies and stay adaptable, keeping up with recent key developments and ongoing innovations. To manage teams effectively now and in the future, they must inspire, motivate, communicate clearly, and have a strong vision and execution plan. Given the unpredictability of the future, modern leaders must be innovative, flexible, and able to thrive in today's business environment and society. Effective teams, professions, and organizations rely on leaders who can adapt to societal shifts and foster innovation. By 2025, millennials will make up the majority of the workforce, requiring most executives to guide this new generation with evolving needs. Recognizing this shift is essential, especially since most top leadership positions are currently held by Gen X leaders. Alongside these generational shifts, the corporate landscape is rapidly evolving due to ongoing technological and workplace innovations. Future leaders must navigate these changes, adopt new advancements, and address complex problems as they emerge. This study aims to provide a detailed overview and assessment of contemporary leadership practices and the challenges faced in 21st century where cutting-edge technology is crucial.

Industrial Revolution and Global Development: The ongoing industrial revolution is influencing every continent, prompting a reevaluation of AI service models and products. Innovative service approaches are reshaping the industry, with technological advances mainly enhancing production efficiency. Nowadays, services are more personalized to individual clients using big data analytics, going beyond mere business requirements. The following explores the evolution of industrialization time.

Industrialization-Industry 1.0: Often referred to as the 18th century, this era marks the start of the industrial age, characterized by the rise of machine-made products and services. The steam engine, a pivotal element of the First Industrial Revolution, replaced many workers and triggered social upheaval. Nonetheless, the steam engine was crucial for the growth of railways, coal mining, and heavy industries. Developed and initially implemented in British factories at the end of the 18th century, it played a key role in the swift expansion of industry by supplying power wherever needed.[10]

[3] Hossain K A, (2023f), Analysis of Present and Future Use of Artificial Intelligence (AI) in Line of 4th industrial Revolution (4IR), Scientific Research Journal 11 (8), ISSN: 2201-2796, Aug 2023, accessed on 14 Dec 2025

[4] Hossain K A, (2015), Leadership qualities for 21st century leaders, Journal of Management, Social Science and Humanities, published on 19 May 2015, available at: http://pearlresearchjournals.org/journals/pjmssh/archive.html, accessed on 31 Jul 2025

[5] Frost P.J., (2003), Toxic Emotions at Work: How Compassionate Managers Handle Pain and Conflict. 1st ed. Harvard Business School Press; Boston, MA, USA: 2003. pp. 13–139, accessed on 21 Oct 2025

[6] James, A. (2013). Transformational vs. transactional leadership theories: Evidence in literature. 355–361, accessed on 01 Oct 2025

[7] LIMS, (2023), Nobody always sees the whole pictures, our AI do; available at: www.lmis.de/im-wandel-der-zeit-von-industrie-1-0-bis-4-0,accessed on 11 Dec 2025

[8] Freudenberger H.J., (1974), Staff burn-out. J. Soc. Issues. 1974; 30:159–165. doi: 10.1111/j.1540-4560. 1974.tb00706. x., accessed on 21 Dec 2025

[9]Hossain, K. A., (2023e), Evaluation of Influence of Internet of Things (IOT) Technologies and Devices in 21 Century, Scientific Research Journal 11(7), ISSN: 2201-2796, Jul 2023, accessed on 14 Feb 2025

[10] LIMS, (2023), Nobody always sees the whole pictures, our AI do; available at: www.lmis.de/im-wandel-der-zeit-von-industrie-1-0-bis-4-0,accessed on 12 Feb 2026

Electrification-Industry 2.0 When electricity was introduced in the late nineteenth century, it sparked the second industrial revolution. During this period, the assembly line emerged as a key manufacturing method, first adopted in the automobile industry. It effectively automated and sped up production. The term "Industry 2.0" refers to a phase characterized by workers with specialized skills performing specific tasks, marking the beginning of mass production. At the same time, the first large-scale cross-continental shipping of manufactured goods occurred. The invention of flight greatly facilitated global transportation and trade this.[11]

Digitization - Industry 3.0: The third industrial revolution began in the 1970s, driven by digitization, advances in information technology (IT), and increased automation. During this time, internet access and personal computers became common in workplaces, leading to a significant rise in employment automation and global knowledge sharing. In mass production, machines began replacing human workers, indicating a move toward automation. Even then, some technological developments that would later define Industry 4.0 were already beginning to emerge horizon.[12]

Automatization-Industry 4.0 The term "Industry 4.0" refers to the integration of cyber-physical systems (CPS) into logistics and manufacturing, combining the Internet of Things (IoT) to connect everyday objects and services within industrial processes. This shift is set to transform value creation, impact new business models, downstream services, and the workforce organization. The CPS network consists of ICT systems, personnel, equipment, goods, and objects. It is projected that over 100 billion connected devices will soon be in operation globally. A major difference between the third and fourth industrial revolutions is the integration of AI into services sector.

Four key features define 'automatization' in industrial production: 1) Robots oversee manufacturing, leading to full automation with human involvement rarely needed. An example is the 'smart factory,' which uses few or no human workers. 2) Industry X involves real-time production, where intelligent machines optimize resource use.

Figure 1. AI and future of life[13]and human and robots collaboration in work place[14]

This results in shorter lead times and fewer shutdowns, aside from technical issues. Resources—such as information, materials, and goods—are synchronized across the supply chain based on demand. The system automatically reorders materials when stock levels fall below a set threshold, keeping inventories low. It also reduces storage costs by manufacturing finished goods only in response to actual orders and demand. 3) Manufacturing is decentralized and self-organizing within a network of units, with complete automation covering planning and order handling. 4) Manufacturing processes can be customized at the individual unit level. Future machines will provide limited yet sufficient customization without human input, removing changeover times. To fulfill customer needs, the smart factory either introduces new parts or modifies processes within optimal distribution frameworks process.[15] 'Industry 4.0' describes the integration of networks and sensors to optimize production elements like machinery, resources, and software. Its goal is to help companies compete globally by reducing costs, particularly in workforce planning. Examples in the fields of artificial intelligence and robotics include autonomous vehicles, delivery drones, 3D printers, and "smart factories" capable of manufacturing complex items from a single template without modifications to the process or the necessity for human intervention. Common service models comprise social media platforms such as Facebook and Amazon Mechanical Turk, on-demand services like Uber and Airbnb, content-sharing platforms including Spotify and Netflix, and carpooling services options. Studies suggest that sharing services might increase industry revenue by up to 20 times over ten years. Unlike conventional industries that depended on mass production and economies of scale, current

Artificial intelligence has been around for many years and improves various parts of our daily routines. We see this technology in shopping mall robots that greet visitors and in internet search engines that suggest search terms for.[17]

Figure 2. In future robots will work with human[18] and technological revolution has taken placed[19]

[11]Hossain, K. A., (2023a), An overview of merchant ships, International Journal of Novel Research and Development (IJNRD), Vol 8, Issue 6, June 2023, ISSN 2456-4184,accessed on 12 Feb 2026

[12]Hossain, K. A., (2023b), An Overview of Naval Ships, Scientific Research Journal (SCIRJ) 11 (6), ISSN: 2201-2796, June 2023, accessed on 12 Feb 2026

[13]https://medium.com/@huzaifasays606/the-future-of-artificial-intelligence-in-everyday-life-4b5c19c2b7e9, accessed on 07 Oct 2023

[14]https://www.linkedin.com/pulse/human-robot-collaboration-transforming-future-work-ruthuraraj-r, accessed on 21 Sep 2023

[15]Hossain K A, (2023c), Analysis of Present and Future Use of Artificial Intelligence (AI) in Line of 4th industrial Revolution (4IR), Scientific Research Journal 11 (8), ISSN: 2201-2796, Aug 2023, accessed on 14 Aug 2023

[16]Bloomberg, (2016), available at: www.bloomberg.com/news/videos/2016-05-20/forward-thinking-march-of-the-machines,accessed on 15 Aug 2023

[17]Housman, M., (2018), Why 'Augmented Intelligence' Is a Better Way to Describe AI,AINews, 2018, accessed on 27Aug 2023

[18] Hossain K A, (2023d), Challenges of Development and Operation of Port In 21st Century, IJNRD, ISSN 2456-4184, Volume 8 Issue 5, 23 May 2023, Accessed On 17 Jul 2025

Today, AI systems mimic human analysis, allowing software to learn and think on its own. When software performs tasks typically linked to human intelligence, it is called artificial intelligence. Numerous industries have gained from recent advances in this area intelligence.[20]Today, processes are effective and efficient due to increased technology access and precise forecasts. AI experts believe artificial intelligence will benefit most people in the next decade, but concerns exist about AI's impact on views of humanity, efficiency, and free will. The automation revolution will significantly transform business and society, driving innovation and productivity. Blockchain technology is also expected to impact many sectors, improving optimisation and customer trust. AI is vital in data backup and disaster recovery, ensuring business continuity. Despite advancements, a focus on strong business strategy, clear vision, and capable management remains essential. Caution is needed in risk management, compliance, outsourcing, and AI essential.[21] Existence in the digital realm unlocks human potential while challenging traditional practices. With more than half the global population using code-driven systems, the potential opportunities and risks are greater than ever. As algorithms become more integral to AI, the key question is whether people will genuinely benefit. AI will influence the entire agricultural and food supply chain, from farm to table, both now and going forward.

Additionally, the design and manufacturing of vehicles, trucks, and powertrains will be revolutionized by cutting-edge automotive technologies AI.[22]Breakthroughs in AI technology are set to significantly influence the global aviation and aerospace sectors. These advancements will alter the future of flight and transportation, space communication, airport operations, and air traffic control. Additionally, AI will foster innovation in construction and civil engineering, enhancing quality, safety, and efficiency while reducing costs. Artificial intelligence is also anticipated to transform the use of smartphones, tablets, and wearables, affecting everyday life, work, and service delivery. Consequently, companies are devising strategies to manage AI integration effectively and harness its full potential advantages.[23] Experts suggest that networked AI can increase human productivity but also poses risks to human freedom, agency, and skills. Computers tend to surpass humans in tasks such as pattern recognition, visual clarity, language translation, learning, thinking, and complex decision-making. Smart technologies across sectors such as buildings, agriculture, utilities, communities, vehicles, and business processes are expected to save time, money, and lives, creating a future more closely tailored to individual needs. In healthcare, AI offers promising opportunities, from diagnosing and treating patients to enhancing the quality of life for the elderly. Enthusiasts are particularly hopeful about AI's potential in large-scale public health efforts, utilising the extensive data being generated on topics from diet to personal health genomes.[24]Integrating AI into both formal and informal education can facilitate important reforms.

Today, society is rapidly changing as AI and IoT become central to daily life. For instance, AI devices in healthcare can track our pulse, and during online shopping, we receive AI-generated personalized product suggestions. These are just some ways AI benefits us every day. Looking ahead, AI is expected to have even greater impacts as more organizations, service sectors, and industries adopt this transformative technology to enhance social interactions and workflows. AI can improve communities, societies, and nations by making processes more efficient, increasing workplace productivity, aiding better decision-making, and offering direct support. It can also detect and resolve issues that might go unnoticed or be difficult for humans to handle alone. However, some people remain cautious about AI, concerned about job losses and potential declines in human intelligence. Overall, AI's main advantages include faster, more accurate, and more efficient operations scalability.[25]

Figure 3. AI will transform the transportation sector[26] and Gen-AI will boost healthcare sector[27]

Many jobs currently available are likely to become obsolete within the next 25 years due to the transformative impact of the Fourth Industrial Revolution (4IR) across various sectors. Educational institutions are also feeling these changes, making it crucial to stay informed. We are heading toward a world where social media, cloud computing (both internal and external), AI, machine learning (ML), deep learning (DL), IoT, and big data create new opportunities and challenges for traditional education providers. Graduates now face a landscape where higher education may decline in service quality as students seek more than just a diploma or completion of school. AI-driven technologies are transforming society significantly, making concepts like "post-work" increasingly relevant. The skills needed now differ from those during the Third Industrial Revolution, when IT was dominant. The AI market is projected to reach $15 trillion in seven years. Meanwhile, large-scale layoffs of unskilled workers with traditional education appear imminent, even as millions of new high-tech jobs are expected to be created skills. [28]

[19] https://www.chinadaily.com.cn/opinion/2017-10/31/content_33921693.htm, accessed on 17 Aug 2023

[20]Jordan, M.I.; Mitchell, T.M. Machine learning: Trends, perspectives, and prospects. Science 2015, 349, 255–260

[21]Unified architecture for machine learning in 5G and future networks, Technical Specification TU-T FG-ML5G-ARC5G, January 2019, accessed on 27Aug 2023

[22]https://www.emerald.com/insight/content/doi/10.1108/BPMJ-10-2019-0411/full/html, accessed on 23 June 2023

[23]https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3661469, accessed on 23 June 2023

[24] https://www.mdpi.com/1660-4601/20/5/4541, accessed on 01 Jan 2026

[25]Vermani M., (2022), Tackling workplace toxicity, Empl. Benefits Wellness Excell, 2022;9:36–38, accessed on 21 Oct 2025

[26]https://www.linkedin.com/pulse/10-ai-trends-transforming-transportation-industry-in2025-api4ai-jnygf, accessed on 11 Oct 2025

[27]https://www.healthdatamanagement.com/articles/gen-ai-and-narrow-ai-bridging-technology-in-health-and-care?id=134010, accessed on 11 Oct 2025

[28]Harris Karen, et al, (2018), "Labor 2030: The Collision of Demographics, Automation and Inequality," Bain and Company Reports, accessed on 27Aug 2025

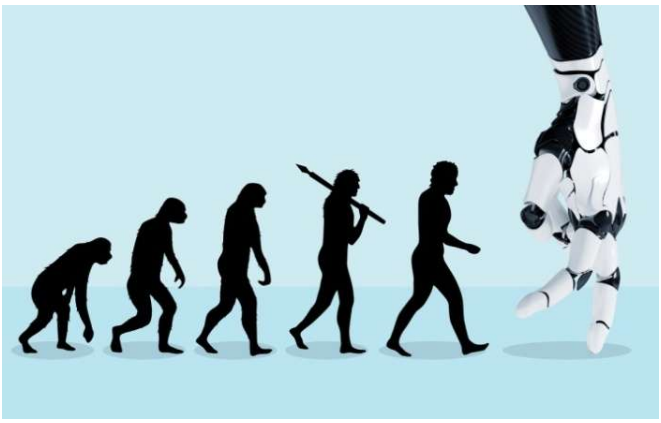

Figure 4: Emerging cyber security is a challenge[29] and uncertainty with singularity is ahead[30]

Toxic Work Environment: Negative emotions such as punishment, rejection, guilt, defensiveness, and humiliation are prevalent in toxic workplaces. Harmful behaviors exhibited by management and colleagues, including berating, manipulation, shouting, and bullying, hinder employees' ability to perform effectively. Identifying workplaces characterized by hostility, sexism, racism, xenophobia, or other damaging traits can be challenging. Such environments contribute to increased stress and burnout, prompting some employees to meet only the minimum requirements or to quietly resign to avoid exhaustion. Although toxic incidents occur in every organization to some degree, neglecting them undermines motivation, creativity, and overall engagement output.[31]Individuals may experience physical and mental health problems such as anxiety, stress, depression, and burnout syndrome (BS), which can also affect their relationship with the company strained.[32]Although often seen as an OT-related issue, BS is fundamentally a dynamic and evolving process that also involves fatigue. [33]Depersonalization regarding one's own achievements and self-esteem.[34]Additionally, BS is a syndrome characterized by physical and emotional exhaustion, which causes employees to develop negative attitudes toward their jobs, despite their desire to engage declines.[35]People experiencing BS often feel helpless, hopeless, and overwhelmed. The stress caused by OT in the relationship between OT and BS is substantial, as stress is one of the harmful effects OT can exert on employees. Continued stress over time greatly contributes to the development of various issues BS.[36]Schaufeli and Enzmann contend that burnout originates from sustained work-related stress. Numerous scholarly studies corroborate this, demonstrating that overtime (OT) has a positive impact on burnout syndrome (BS). Burnout not only impacts employees but also has wider repercussions, serving as a principal factor in the development of depression. Due to their similarities, BS and depression are occasionally regarded as interchangeable. Some research suggests that BS can precipitate depression, while other studies imply that depression may also be a consequence of this condition BS[37]. Replacing multiple CEOs in pursuit of the optimal solution is quite uncommon for organizations confronting leadership challenges. It is analogous to swapping roles on the Titanic. While consultants and coaches can address superficial symptoms of toxicity, they will not attain long-term success unless they confront the fundamental causes. Indicators of a toxic work environment vary depending on the individual, their habits, and triggers. The health consequences of remaining in such a workplace over time are genuine; common issues include headaches, insomnia, gastrointestinal problems, and a weakened immune system. These environments also diminish employee morale, increase absenteeism, and decrease productivity. The signs of toxicity differ among employees based on their personal work styles and triggers. Prolonged exposure can have serious implications for an employee's physical health well-being.[38]Common stress-related problems such as headaches, insomnia, digestive issues, and weakened immunity frequently occur. These problems not only impact employees directly but can also lead to increased absence and lower productivity. Managers should be attentive to these signs as possible indicators of a toxic work environment.

No room for mistakes: Everyone aims to perform well, but a toxic work environment becomes evident when employees are prevented by fear of making mistakes. In a blame-oriented workplace, staff naturally fear punishment for errors. This fear results in excessive caution, hindering experimentation and innovation, which ultimately harms the team overall.[39]

Lack of trust: A lack of trust among employees leads to a toxic work environment, making workers feel excessively supervised by management mistrust. When managers micromanage, employees often start doubting their own skills and motives talents.

Role confusion: Employees may experience anxiety if their roles are not well-defined, which can lead to workplace issues. Conflicts among coworkers over responsibilities and workload sharing can also occur. Clearly communicating expectations helps to avoid these conflicts role.[40]

Mental stress*:* Working in a toxic environment can lead to physical stress symptoms. The brain perceives danger, which explains why your body and mind might stay on high alert. Because the human brain is always looking for threats, being in a 'fight or flight" state frequently can harm your physical health. You might also notice

[29] https://www.artsyltech.com/blog/how-cybersecurity-threats-are-evolving-in-the-modern-digital-landscape,

[30]https://time.com/6283958/darwinian-argument-for-worrying-about-ai/, accessed on 25 Sep 2023

[31]Bailey D., et al, (2008), Sustaining Our Spirits: Women Leaders Thriving for Today and Tomorrow. NASW Press; Cary, NC, USA: 2008. pp. 14–37, accessed on 21 Oct 2025

[32]Maslach C.A., (1998), Multidimensional theory of burnout. In: Cooper C.L., editor. Theories of Organizational Stress. 1st ed. Oxford University Press; Oxford, UK: 1998. pp. 68–87, accessed on 21 Oct 2023

[33]Schilpzand P., et al, (2016), Workplace incivility: A review of the literature and agenda for future research. J. Organ. Behav. 2016; 37:57–88, accessed on 21 Oct 2025

[34]Freudenberger H.J., (1974), Staff burn-out. J. Soc. Issues. 1974; 30:159–165. doi: 10.1111/j.1540-4560. 1974.tb00706. x., accessed on 21 Oct 2023

[35]Maslach C., (1981), The measurement of experienced burnout. J. Occup. Behav., 1981;2:99–113, accessed on 21 Oct 2023

[36]Maslach C., (2001), Leiter M.P. Job burnout. Annu. Rev. Psychol. 2001; 52:397–422, accessed on 22 Oct 2023

[37]Bauernhofer K., et al, (2018), Weiss E.M. Subtypes in clinical burnout patients enrolled in an employee rehabilitation program: Differences in burnout profiles, depression, and recovery/resources-stress balance. BMC Psychiatry. 2018; 18:10, accessed on 22 Oct 2025

[38]Colligan T.W., (2006), Workplace stress: Etiology and consequences. J. Workplace Behav. Health. 2006; 21:89–97. doi: 10.1300/J490v21n02_07, accessed on 22 Oct 2025

[39]Housman, Michael; Dylan, Minor (1 November 2015), Toxic Workers (PDF)., Harvard Business School,archived from the original (PDF) on 15 August 201, accessed on 17 Nov 2023

[40]Baillie, Virginia K.; Trygstad, Louise N.; Cordoni, Tatiana Isaeff (1989), Effective Nursing Leadership: A Practical Guide, Jones & Bartlett Learning, ISBN 978-0-8342-0036-4, accessed on 17 Nov 2025

common signs of stress, such as gastrointestinal problems, sleep difficulties, fatigue, aches, and panic attacks.

Office gossip: While office gossip is common, it becomes more harmful in toxic workplaces. Employees may avoid eye contact, make derogatory comments, and whisper instead of communicating openly. Workplace bullying can result in depression, fatigue, and anxiety, showing that gossip is far from harmless. This behavior leads to distractions, negative moods, mistrust, and workplace drama. When employees spread damaging rumors, gossip fosters a toxic environment.[41]

High turnover rates: High employee turnover often signals deeper issues within a company's work culture. Common causes include inadequate pay, few advancement opportunities, and a toxic organizational atmosphere. A lack of long-term staff may also indicate a negative environment. In such settings, employees tend to become emotionally disengaged, feeling disconnected from their work, colleagues, and the organization as a whole. Experts note that this problem worsens in online workplaces, where employees often keep their cameras off during meetings and communicate mainly through brief comments. Over time, this can lead to more employees departing from these unhealthy environments rates.

Unhealthy work boundaries: Toxic organizational cultures frequently undermine healthy work-life boundaries by promoting excessive work commitments. They may compel employees to remain at work late, respond to emails outside standard hours, or complete tasks beyond regular working times, thereby elevating the risk of burnout weekends.

Gaslighting: Gaslighting was selected as Merriam-Webster's Word of the Year for 2022. It occurs when an individual manipulates another to doubt their perceptions. Examples encompass hearing gossip about oneself, feeling dismissed regarding one's emotions, being excluded from work meetings, or receiving negative reports about oneself performance.[42]

Lack of career support: Some employees feel unsupported in their career development, often experiencing isolation from their team and lacking mentorship. Without adequate guidance, making decisions about their next career moves can be challenging. As remote work increases, building relationships with colleagues or managers, especially at entry level, becomes even more difficult employees.[43]

Low morale and negativity: Low employee morale can lead to widespread negativity in the workplace, impacting others. It's essential to address negative attitudes swiftly. Management needs to identify their underlying causes to break the cycle and foster a more productive and positive work environment.

Sick guilt: Sick guilt occurs when someone feels ashamed for not performing well during illness. These individuals often hesitate to take leave or request remote work, even when they do, feeling guilty. To break this harmful cycle, employees need to feel safe discussing their needs, understand how to do so properly, and be honest about their limits. Employers should cultivate an environment that promotes openness and understanding. When someone feels guilty about not giving their best while sick, it is called sick guilt. This shame can lead to the avoidance of requesting remote work. To address this, workers should feel comfortable sharing their overwhelm, recognize when to take breaks, and honestly admit when they can't meet expectations. Companies should foster such an environment atmosphere.[44]

People don't trust each other: Distrust among coworkers is a clear sign of a toxic workplace. Bohemond notes that one company has management offices facing employees' desks, enabling constant supervision. These environments typically involve supervisors frequently checking in with their teams. Whitney Simon, a communications strategist and inclusion specialist, often the only person of color on her teams, explains that micromanagement as a Black woman intensified her feelings of imposter syndrome. She remembers internalizing her employers' distrust, thinking, "If I were more capable, they wouldn't have had to chase me on projects." She now clarifies that this is no longer true. "But I now realize that teams led by overly controlling micromanagers tend to" fail. [45]

Challenges and Practice Need for Contemporary Leaders: There are many challenges and gaps of true cognizant and contemporaryleaders, whether in politics, religion, organization, business, education,or institutions, everywhere in era of technological advancement. Famous orgreat leaders globally recognize the significant role of technology that plays inpersonnel management. It may facilitate team development and oversee workacross all channels and locations globally. The normal workplace is no longer as conventional as it once was due to technological advancements and globalization. Once more, workplace toxicity is a prevalent concern that can impedethe performance of employees and the overall profitability of an organization.

Figure 5. Contemporary leadership in high-tech era[46,47]

[41]Bitting, Robert. "Using Effective Leadership Strategies in the Workplace", *Archived from the original* (PDF) *on 2011-08-13,* accessed on 17 Nov 2025

[42]Rasool S.F., (2021), How toxic workplace environment effects the employee engagement: The mediating role of organizational support and employee wellbeing. Int. J. Environ, Res. Public Health, 2021;18:2294, accessed on 21 Oct 2025

[43]Sull, Donald; Sull, Charles (2023-03-14), "The Toxic Culture Gap Shows Companies Are Failing Women", MIT Sloan Management Review, accessed on 17 Nov 2025

[44]Srivastava R.V., (2021), The Matthew effect in talent management strategy: Reducing exhaustion, increasing satisfaction, and inspiring commission among boundary spanning employees. J. Bus. Ind. Mark. 2021; 37:477–496, accessed on 23 Oct 2025

[45]Karwowski W., (2006), Toward an operational prevention of chemical risk in the working environment. In: Healthcare I., Karwowski W., editors. International Encyclopedia of Ergonomics and Human Factors-3 Volume Set, CRC Press; Boca Raton, FL, USA: 2006, pp. 746–753, accessed on 21 Oct 2025

[46] Hossain K A, (2025b),Problem of Toxic Leadership Instead of Modern Leadership at New Age in 21st CenturyOpen Journal of Leadership, 2025, 14(3), ISSN Online: 2167-7751, ISSN Print: 2167-7743,Available from: https://www.scirp.org/journal/ojl,accessed on 21 Jan2026

Modern leaders must embrace a more contemporary management approachin order to achieve success. This involves adopting novel tactics and conceptswhile simultaneously remaining adaptable and receptive to change. Nonetheless, a counterargument exists asserting that traditional leadership remains relevantand that both techniques can be integrated concurrently.In a toxic work environment, employees may be apprehensive about expressing theiropinions, worries, or thoughts due to fears of rejection or reprimand. Unethicalconduct, including racism, deception, or the making of false promises, may alsoresult from a hostile work environment. Organizational toxicity affects all levels, from executive boards to followers, and leadership is relationship-driven.[48] The entire organizational system has been diseased, and chopping off the rotten head will not be effective. The initial step inenhancing a culture is to identify the factors that contribute to its toxic nature. Ifleaders endeavor to enhance every component of business culture that some peoplefind bothersome, they will waste their time and energy. Instead, they shouldfocus on resolving the fundamental issues that cause the most distress for employees, which in turn leads to disengagement, negative perceptions of their employer,and resignation.

In the 21st century, super-intelligence, hyper-intelligence, or superhuman intelligenceis a hypothetical agent with intelligence much beyond that of the mostgifted and bright human mind. Agentsintelligence can alternatively be called "super-intelligence. Artificial general intelligence research may enable innovative software to self-reprogram and improve. The enhanced software would be evenbetter at self-improvement, causing recursive self-improvement. If it has an intelligenceexplosion, its cognition may rise exponentially and exceed humans. Thiscircumstance was called "singularity" by science fiction author Vernor-Vinge.Since the limits of intelligence and super-intelligent computers are unknown, thetechnological singularity is unforeseeable and unfathomable. In hours, ML or AIcan build tens of thousands of harmful substances. Thus, complex technology orsuper-intelligent robots may arise shortly. Leaders of the future must be ready.[49] Inthis tech-driven era in 21st century, good leadership requires strong beliefs.Leaders need technology,but they also need honesty, agility, and balance. Transparent communicationbuilds trust and teamwork. To encourage ideation and feedback, leaders must behonest with their teams, stakeholders, and themselves. Adaptability and flexibilityare key to success. Leaders must adapt to evolving technologies. It enables leaders to capitalize on emerging opportunities, adoptinnovative ideas, and effectively manage challenges in a rapidly changing industry.[50]Effective leaders achieve a harmonious equilibrium between the human andtechnological components. Although technological utilization is essential, it isequally criticalto value interpersonal relationships, emotional intelligence, andempathy. It is undeniable that the workplace has undergone a significant transformationin recent years as a result of the proliferation of new technologies. Nevertheless, there are several instances in which traditional leadership yields superiorresults, such as when stability and order are essential, or during a period ofcrisis.[51] The fundamental principle is that a leader must be capable of adapting tothe circumstances and use the appropriate theories, tools, tactics, and approach tocomplete the mission. In this high-technology era, contemporary leaders are required to cultivate a modern mindset to effectively address specific challenges. The fundamental trait is agility: being adaptable, receptive to change, and proactive. Leaders must foster stronger relationships with their teams to cultivate an environment where creativity thrives and change is perceived as an opportunity rather than a source of fear. Effective leadership today is characterized by several key behaviors, including adopting a more people-centric management approach instead of focusing solely on results, developing innovative solutions tailored to the current environment, proactively implementing new processes, and encouraging teams to embrace change. Additionally, leaders benefit from diverse perspectives, emotional support, and personal growth opportunities through trusted friendships outside the workplace, which enhance their leadership capabilities and enrich their lives.

Historically, influential leaders have leveraged technology to promote innovation and revolutionize sectors such as business, education, and services. Elon Musk, through Neuralink, SpaceX, and Tesla, exemplifies leadership in pioneering technological advances, space exploration, and sustainable energy solutions. Bill Gates, co-founder of Microsoft, played a pivotal role in the personal computer revolution and has dedicated himself to combating poverty, improving global health, and promoting education via the Bill & Melinda Gates Foundation. Steve Jobs, co-founder of Apple, transformed the technology and entertainment industries with groundbreaking devices such as the iPhone and iPad, fundamentally changing our ways of living and working. His focus on design and user experience set new industry standards. Jan Koum and Brian Acton, creators of WhatsApp, demonstrated technological innovation by redefining communication and enabling millions worldwide to connect easily. Fostering a collective leadership environment starts with a shared goal rooted in core values and beliefs that guide each individual's actions. It requires some "inner work" from practitioners, since genuine collective leadership depends on this internal effort. These values form the foundation of the work. Proponents of shared leadership believe everyone can self-lead, with group members, not just designated leaders, holding the skills and resources to achieve goals. Formal leaders should create a framework that supports self-leadership instead of just giving orders. They share or distribute the "power" of their role, enabling the group to take responsibility, collaborate, make decisions, plan, and act. Whenever possible, they are willing and able to delegate authority. Even when formal power is shared, personal power remains visible. The need for formal authority can be replaced by the satisfaction of seeing the group develop into a community or learning organization.

Once this shared foundation is in place, modeling behavior becomes a key part of the vision. Leaders must have a sincere vision of shared leadership, reflected in how they organize and manage the group's growth. With practice, vision, and modeling, members trust that leaders truly uphold their principles by believing in each individual and their collective efforts. Developing a learning environment as collective or reciprocal leaders takes time. This process generally involves: first, setting achievement expectations; second, inspiring the group to challenge the status quo and pursue new challenges; and finally, questioning their own beliefs about what they can accomplish without direct supervision authority.In 4IR, technologies can lead to enhanced quality of life through improvements inhealthcare, education, transportation, living, distribution, and other necessaryservices. The integration of 4IR technologies can stimulate economic growth andnational development by fostering innovation, creating new markets, and improvingoverall economic efficiency. According to 4IR Energy Solutions,it is also opening the ways to address social inequalities by providing access to education, healthcare, and economic opportunities for all.[52] A leader must ensure their approach to satisfy three essential criteria beforestarting any technology-based project: technical feasibility, financial viability, andlegal acceptability. When assessing technical feasibility, it is important to examinehow well the proposed technology aligns with

[47] https://blog.emb.global/strategies-for-tech-leadership/, accessed on 23 Oct 2025

[48] Hetrick, S. (2024). Toxic Organizational Cultures and Leadership. Routledge, Available from: https://doi.org/10.4324/9781003330387, accessed on 21 Jan 2026

[49] James, A. (2013). Transformational vs. Transactional Leadership Theories: Evidence in Literature, (pp. 355-361),

[50]Kadiyono, A. L. et al. (2020). Develop Leadership Style Model for Indonesian Teachers Performance in Education 4.0 Era. Systematic Reviews in Pharmacy, 11, 363-373, accessed on 30 Jan 2026

[51] Karthikeyan, D. C. (2017). An Exploratory Study on TOXIC Leadership and Its Impact on Organisation: A Leadership Perspective. International Journal of Research in Social Sciences, 7, 336-362, accessed on 30 Jan 2026

[52] 4IR Energy Solutions (2023). What Is 4IR (Fourth Industrial Revolution), Available from: https://energy4ir.co.za/what-is-4ir-fourth-industrial-revolution/, accessed on 30 Jan 2026

the organization's infrastructureand capabilities. The successful execution of the plan will be determined by conductinga comprehensive technical review. The subsequent step is to evaluate itsfinancial viability.[53] In order to ensure compliance, leaders mustnavigate legal and regulatory frameworks. They need to understandintellectual property rights, data privacy laws, and other relevant standardsto prevent legal issues. The evolution of technology demonstrates the significantinfluence of human intelligence on society. Understanding this progression helpsleaders use technology to alter their decision-making.[54]Thewheels inventionhas transformed transportation and trade, facilitating the expansionof civilizations. The promise of this straightforward yet potent technologicalinnovation was acknowledged by the leaders of that era, who employed ittobroaden their empires.

The digital age and the emergence of computersexpedited the speed of invention.[55] Digitalization simplifies processes, improves communication, and expandsmarkets, giving leaders an edge.[56]Intelligent and modern CEOs may use AI, IoT,ML, and big data for predictive analysis, data-driven decision-making, and automation.These breakthrough technologies benefit many industries, enterprises,service sectors, and aspects of life. Tech is becoming more beneficial in manyfields. Technology is causing a digital and intelligent revolution. Intelligent leadersmust adapt to new technology. If not, they cannot connect and lead globally. AIand robots' ability to automate occupations, enhance decision-making, and simplifyprocesses will alter the workplace in the coming decade. AI-powered gadgetscan analyze massive data sets, identify patterns, and make precise predictions.This enables leaders to make data-driven decisions, thereby improving competitiveness,efficiency, accuracy, cost, and idea generation. AI may also automate ordinarytasks, freeing up time for subordinates and men to focus on strategic andcreative work. This shift in focus boosts innovation and personnel satisfaction. AIallows customized team experiences, like learning and development programs andcareer routes. AI and other modern technologies can help leaders build a futureproof,sustainable, adaptable, flexible, and purpose-oriented company that thrivesin the rapidly evolving military domain and future battle-space.

CONCLUSION

Contemporary leaders don't need high-ranking titles to prove their effectiveness in 21st century within high-tech era. The rise of technologies like IoT, AI, ML, DL, blockchain, big data, etc. are transforming the workforce, impacting fields like industry, financial, transportation, law, engineering, and healthcare. Traditionally, leadership emphasized expertise, but that emphasis is shifting. Future leaders must focus on managing relationships and fostering collaboration within teams. The ability to communicate, motivate, and influence is essential for effectively managing human resources and benefiting both the company and its workers. Recent leadership becomes a powerful force when individuals are willing to harness their influence, articulate a compelling vision, and create a lasting impact. The change in attitude encourages creativity and grows a happier, more invested staff.

At last, AI makes it possible for teams to provide more customized experiences, like individualized career routes and learning and development programs. Leaders can build a resilient organization that can adapt to the changing business and manufacturing landscape and future battle-space by utilizing AI and other modern technologies. This organization will be more purpose-oriented, agile, resilient, and future-proof. Using AI, students can tailor their education to their specific needs. The educational process and the abilities of educators can both be enhanced by the technological advancements made possible by artificial intelligence.

Major banks and other financial organizations are incorporating AI into their investment strategies. Aladdin, BlackRock's artificial intelligence engine, is utilized for investment decision support by both the firm and its clients.Contemporary leaders can make educated judgments, generate innovation, and remain ahead of the competitionby leveraging technological improvements, which also boost efficiency andproductivity. The emphasis is on how organizations, agencies, businesses, industries,or nations can get effective leadership style to achieve their missionand vision. Creating an environment where modern and collective leadership thrive begins with a shared goal rooted in core values or beliefs that shape individual behavior. Those practicing this leadership style must engage in "inner work,' which is vital for authentic collective leadership. This work depends on honesty, values, and beliefs. Advocates believe everyone can guide themselves, with group members, rather than a single leader, possessing the skills to accomplish tasks. Consequently, positional leaders aim to develop a framework that encourages self-leadership instead of issuing commands, sharing, or distributing power based on roles. Leaders facilitate the group's responsibility and skill development in collaboration, decision-making, planning, and action, delegating authority when appropriate.

While they hold formal authority, their personal power remains significant, and they often find fulfillment in seeing their group evolve into a community or learning organization, rather than relying solely on formal authority. After establishing a shared vision, demonstrating commitment through actions is essential. Leaders show dedication to the vision by organizing and responding to group growth. Trust develops as members observe leaders embody their values, believe in each member, and reflect collective practice, vision, and modeling. Leaders practicing collective or reciprocal leadership invest time in creating learning environments, setting success expectations, and encouraging the group to question the status quo and take risks. Without explicit guidance from traditional authority, individuals are inspired to challenge their assumptions about their abilities. In today's high-tech environment, leaders need to listen to team opinions, concerns, and suggestions, as employee listening tools become vital. Creativity is key for problem-solving. Effective leaders today demonstrate honesty, flexibility, agility, humility, courage, judgment, and innovation. They focus on critical responsibilities, develop them as needed, and delegate other tasks to maximize value and foster self-improvement, ultimately benefiting the organization.

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