

Research Article

Appraise the Contemporary Leadership Practice in the Era of Smart and Advanced Technology

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Abstract

By closely analyzing contemporary leadership techniques in the global arena of intelligent and sophisticated technology, this study seeks to evaluate the idea and practice of leadership in the current era. The capacity to express a vision, uphold its principles, and create an atmosphere where everyone can achieve the objectives and demands of the company is what it means to be a leader. At the highest echelons of an organization, leaders are typically those who hold authority, responsibility, influence, and power. But this is completely false. They are the individuals who inspire and motivate others through their behaviors, demeanors, and abilities. Modern leaders are surrounded by people who share their enthusiasm, energy, and mindset. They have a genuine fan base, teammates, and lovers, yet they are not motivated by fame or popularity. They have a clear vision and goals, and they have achieved them without requiring any special privileges, rights, or positions. In the present period, one's position or rank has little bearing on leadership. They typically continue to function as an executive senior to whom the subordinates are compelled to bow, even while their views and goals are completely at odds. Modern leaders can remain ahead of the competition, make wise judgments, and develop creative solutions that boost efficiency and production by leveraging technological innovations. The emphasis is on how businesses, sectors, organizations, agencies, or nations may acquire an effective leadership style to achieve their objectives. World-class leaders are aware of the critical role technology plays in human management. Teams may benefit from it as they expand and manage work across all platforms and locations worldwide. Standard employment is no longer as traditional as it once was due to technological advancements and globalization. Modern leaders must take a more deliberate approach to management if they are to thrive. This means being adaptable and receptive to change while simultaneously accepting new tactics and concepts. Modern leadership approaches are more appropriate in today's firms, which often struggle with innovation and change, particularly in a global setting where technology is crucial. In this age of intelligent technology, the research will look into contemporary leadership techniques from a worldwide perspective. In order to be successful, the author will also examine how technology has altered leadership, the development and ensuing difficulties of leadership globally, and the essential values and characteristics of contemporary leaders.

Keywords

Smart Technology, Artificial Intelligence, Machine Learning, Robot, Contemporary Leadership

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1. Introduction

Leadership has always been a vital instrument for leaders to guide the development of a company, a country, or the entire world in a relative dealing with connected modern circumstances, regardless of the era or culture. As a result, the value and significance of leadership are more recognized in the modern period. In today's quickly changing culture, making effective use of technology and contemporary lifestyles has become essential to leadership. Technology has a huge impact on every part of human existence and is changing how contemporary leaders communicate, carry out everyday duties, and manage their businesses. Today's leaders can persuade others to believe in them regardless of their position or social status [1]. Being a chief, manager, senior executive, or holding a high position are not necessary for effective and modern leadership. The Internet of Things (IoT), artificial intelligence (AI), machine learning (ML), deep learning (DL), big data, blockchain, cloud computing, platform economy offers, big data, and algorithm-based judgments are all currently changing the landscape of brain workers. The complicated scenario affects not only auditors but also lawyers, engineers, doctors, data scientists, and computer scientists. In actuality, a few decades ago, leadership was based on extraordinary skill. This focus is progressively diminishing. Future leaders will be mostly responsible for managing relationships. Future leaders need to create a positive, innovative tension in order to foster connections and collaboration between teams and departments. Therefore, the best and most qualified candidate to manage human resources in a way that benefits the company and its employees is a modern leader who has the requisite ability to interact, communicate, convince, motivate, and influence [2, 3]. When people apply their influence, thought, vision, and effect, modern leadership is effective. Achieving a healthy work-life balance and safeguarding their mental health may be even more important to millennial leaders than to Gen Z. Ralph Waldo Emerson once stated, "Avoid going down the wrong path. Instead, leave a trail by going where there isn't a path."

While using technology is crucial for leaders today, interpersonal connections, emotional intelligence, and empathy are just as important. The emergence of new technology has undoubtedly caused a considerable upheaval in the workplace in recent years. However, there are a number of situations where traditional leadership does better, such as in times of crisis or when stability and order are crucial. The basic idea is that in order to accomplish the task, a leader must be able to adjust to the situation and employ the right ideas, instruments, strategies, and methods. Before beginning any technology-based initiative, a leader must make sure their strategy satisfies three crucial requirements: legal acceptability, financial viability, and technical feasibility [4]. Examining how well the suggested technology fits with the organization's skills and infrastructure is crucial for determining technical feasibility. A thorough technical review will be carried out to establish

whether the strategy is executed successfully. Assessing its financial viability is the next stage [10]. Leaders need to consider the costs associated with implementing technology. To ascertain whether the advantages outweigh the related expenses, they had to evaluate the Return on Investment (ROI). For these processes, the examination of anticipated revenue generation, upkeep costs, and upfront expenditures is crucial. Therefore, it is essential to determine whether the reformation in question is lawful. Leaders must negotiate legal and regulatory structures to guarantee compliance [11]. To avoid legal problems, they must comprehend data privacy rules, intellectual property rights, and other pertinent requirements. Technology's development shows how important human intelligence is to society. Leaders can use technology to change their decision-making by being aware of this trend. [12]. The development of the wheel has revolutionized trade and transportation, enabling the spread of civilizations. In order to expand their empires, the leaders of that age recognized the potential of this simple but powerful technological advancement. The steam engine, which transformed manufacturing and transportation, marked the beginning of the Industrial Revolution. Leaders like James Watt used this method to jumpstart development and change entire industries. The invention speed was accelerated with the advent of computers and the digital age [13]. The maintenance and expansion of companies benefit from the combination of operational compliance procedures and capable executives. "Management is doing things right," stated Peter Drucker. Being a leader means doing the right thing.

In the technology-driven age, effective leadership depends on strong beliefs. Leaders need technology, but also honesty, agility, and balance. Transparent communication fosters trust and teamwork. To promote idea sharing and feedback, leaders must be honest with their teams, stakeholders, and themselves. Digitalization streamlines processes, enhances communication, and broadens markets, giving leaders a competitive advantage. Modern CEOs leverage AI, IoT, ML, and big data for predictive analysis, data-based decisions, and automation. These technologies benefit many sectors, industries, and aspects of life and are fueling a digital and intelligent revolution. To stay connected and lead globally, leaders must adapt to new technologies. Over the next decade, AI and robots will automate jobs, improve decision-making, and simplify workflows. AI-driven devices can analyze vast data, identify patterns, and make accurate predictions, enabling leaders to make informed decisions that improve competitiveness, efficiency, accuracy, costs, and innovation [16]. AI also automates routine tasks, freeing up time for strategic and creative work, boosting innovation and employee satisfaction. It allows tailored team experiences, such as training programs and career paths. Modern technologies help leaders build sustainable, adaptable, and purpose-driven organizations that thrive in the evolving military and future battle-spaces. AI can personalize education and

enhance teaching skills. Large financial firms use AI to streamline investments; for example, BlackRock's AI engine Aladdin assists clients with financial decisions. During the Fourth Industrial Revolution (4IR), these technologies can improve quality of life through advancements in healthcare, education, transportation, living standards, and distribution. Integrating 4IR innovations can boost economic growth and national development by fostering innovation, creating new markets, and increasing efficiency [14]. 4IR Energy Solutions claims that by giving everyone access to economic, healthcare, and educational opportunities, it is also paving the way for addressing social injustices [15]. Leaders need to change with the times [17]. "Leadership and learning are necessary to each other," stated John F. Kennedy. According to Martin Luther King Jr., "A true leader molds consensus rather than seeking it out." [11] According to Apple co-founder Steve Jobs, "Innovation separates a leader from a follower."

Future leaders must be prepared to seize new possibilities, embrace creative solutions, and successfully handle obstacles in a sector that is changing quickly. The human and technological elements are harmoniously balanced by effective leaders. Persuading, influencing, inspiring, and motivating people are all part of modern leadership. It is very different from traditional leadership, which is based on ranks, titles, or positions. Command is constrictive and may lead to disagreements or objections from people who are not moved, inspired, or impacted by the goals, vision, concepts, and viewpoints. Because followers or team members can relate to and be persuaded, a modern leader who successfully motivates people by clearly outlining the benefits and downsides of actions, tactics, and plans in a practical, on-the-ground manner is more likely to be accepted and followed. In contrast to influence, control, command, and order, modern leadership relies on engagement, communication, care, and attention. Therefore, modern leadership is a comprehensive strategy, lifestyle, attitude, and conduct rather than being centered on rank, position, or title. Along with job accomplishment or output, modern leaders place equal importance on employees' professional attitudes and personal development. Leaders need to cultivate an attentive and caring relationship with their employees. As a result, contemporary leadership is a comprehensive way of living in which people hone their behavioral abilities to encourage and inspire their team members to follow in their footsteps. Command, control, power, and ranks/titles provide potential for leadership, but they are far from the characteristics of a contemporary, successful leader. The author's goal has been to present a thorough analysis of leadership in the twenty-first century, taking into account the influence of cutting-edge technology. The impact of new technologies, the fallout from the fourth industrial revolution, the implications of IoT, AI, ML, DL, big data, robots, and other developments, as well as the idea of modern leadership and other current leadership concerns, will all be covered in this essay. This paper presents a thorough examination of various leadership approaches, styles, and concepts that have been seriously considered by a

number of well-known authors, including Blanchard and Hersey (2013), Warren Bennis (2001), Peter Drucker (1977), Weber et al. (2017), Kotter J P (1988), and others [216-220]. Because of the observation of current development, facts, analysis, and interpretation, this research can be classified as basic, analytical, qualitative, exploratory, and descriptive.

2. Literature and Methodology

The influential and renowned leaders in history for their mankind, civilization and motivation like Moses, who led the Israelites out of slavery in the Exodus from Egypt [213]; Mahatma Gandhi, who was a defender of the principle of non-aggression as a means of revolution [214]; Adolf Hitler, Nazi leader responsible for the Holocaust [215]; Nelson Rolihlahla Mandela, who dismantling the legacy of apartheid by fostering racial reconciliation and a multiracial democracy [212]; groups, sets, and formed coalitions towards one goal. All of those leaders have different characteristics from each other. Some are pacifists, other activists, some conservative, some liberal, some make revolutions using words others using guns, some with a divine commission other against it, but all have something in common: the ability to involve thousands and millions of people and to lead their followers. Interestingly, every leader has their distinct way of influencing, guiding, supervising and motivating their own people or followers to the desired objective, and the delegation of activities or authority is shared with them, sometimes in a very obvious and open way. Freedom and empowerment, on the other hand, are not easy to transmit or share. The study by Conley and You (2018) points out that the leader who shares his management, involving his team in business decisions, improves the organizational climate and still retains employees in the organization to the extent of empowerment [221]. There are leaders, for instance, who have a persuasion power that can make people believe that they are not always in a supportive role; there are leaders who do not let people fall over ostracism, leaders with attitude, who make their colleagues and subordinates understand, accept, and respect the company policy. Leadership, says Robbins and Judge (2025), is the ability to influence a group towards goal attainment [222]. Peter Senge (1990) addresses the collective aspect of leadership, emphasizing that leaders conduct changes, and that is expected from true leaders [223]. The leaders' role is to be a projector, supervisor, and conductor. Avollo (2002) mentions that leadership is the ability to influence individuals and groups [224]. Kotter J P (1988) said that "leading by example has a simple concept: words can be forgotten, but actions cannot". John C. Maxwell said, "A leader knows the way, goes the way and shows the way." Warren Bennis said, "Leadership is the capacity to translate a vision into reality." Mahatma Gandhi said, "I suppose leadership at one time meant muscles, but today it means getting along with people."

McShane and Glinow (2005) separated the complicated

topic of leadership into a few categories, including transformative, implicit, contingent, competent, and behavioral [18]. Businesses may concentrate on both transactional and transformational leadership approaches, but they often choose transformational leadership due to its effectiveness and efficiency. There is a paradox in the study where some people think charismatic and transformational leadership are distinct, while others think transformational leadership is just a continuation of charismatic leadership. Transformational leadership guides the process of strategic companies and is built on behaviors. From the establishment of a community structure based on shared values, leaders propel companies forward [19]. While adopting the transactional leadership style, which addresses analytical concerns, few modern authors have urged leaders to become more inquisitive [20]. However, other authors contend that transformational leadership adds transactional leadership and, with a few tweaks, creates superior leaders [21]. However, an individual leader might have characteristics from both theories [22]. Mazdar (2001) distinguishes between transactional and transformational leadership as two distinct leadership theories. Aaltio-Marjosola and Takala (2000) claim that charismatic leadership is showing symptoms of incapacity and deference [23]. Distress is a justification for accepting charismatic leadership, notwithstanding the leaders' exceptional qualifications. Once again, charismatic leaders are misrepresented and appropriate for portrayal in popular media such as radio, television, and newspapers [24]. When it comes to tasks and leaders, situation-based contingency leadership is crucial. Organizations are under more external strain than internal pressure under contingency leadership. The design of contemporary organizations has been influenced by leadership styles of the twenty-first century. Network architecture, overall quality management, and employee participation have all been significantly impacted by intervention [25]. As a result, any modifications for 21st century leadership styles must be made while coordinating an organization's growth plan. Kotter (2008) asserts that effective leaders never stop until an issue arises and constantly recognize achievement. They look forward and take preventative measures to address any trouble spots that can arise in the future [26]. "As we look forward into the next century, leaders will be those who empower others," said Bill Gates."

A survey of the literature on organizational change and leadership style has been performed by academics and researchers [27]. Several literature assessments have identified authoritarian, transformational, laissez-faire, servant, transactional, democratic, strategic, bureaucratic, consultative, and participatory leadership as accelerators of change management [28]. Subsequent research has shown that effective leadership is critical to the successful implementation of positive organizational changes [29]. The process of leading and directing followers along the path the leader has chosen in order to accomplish organizational goals is known as leadership [30]. The environment and culture of the organization have a

huge impact on how executives behave. The common collection of values, presumptions, and beliefs that shape organizational behavior is referred to as organizational culture by Schein (2010) [31]. On the other hand, workers' opinions and attitudes toward their workplace are related to organizational environment (Schneider, Ehrhart, and Macey, 2013) [32]. According to Aycan et al. (2000), the cultural context affects the interaction between a leader and their subordinates, which in turn affects whether or not certain leadership philosophies are accepted. Additionally, Einarsen et al. (2007) [33] stress how important it is to distinguish between harmful and ineffective leadership. While harmful leadership is intentional actions that injure others, ineffective leadership is characterized by a lack of knowledge or ability to accomplish desired goals. Schneider et al. (2013) [34] emphasized the importance of leaders in shaping the business environment and culture, emphasizing the need for inclusive and moral leadership [35].

Fresh ideas on leadership, like many other parts of business, are being fostered by the rising understanding by companies throughout the globe that distant organizations and events have an influence on their operations [36]. Corporate-level leaders, such as CEOs and upper management teams, have a problem due to the abundance of strategy options available for participating in global competition [37]. Traditional leadership and contemporary leadership differ in a few key ways. The authoritarian style of traditional leaders is typified by the lack of input or participation from others in the decision-making process [38]. On the other hand, contemporary leaders tend to take a more cooperative stance, which involves working together to achieve common goals and include others in the decision-making process. While traditional leadership is based on power and control, modern leadership places a higher priority on collaboration and teamwork. Task-oriented goals may also be given priority by traditional leaders, while people-oriented goals may be given priority by modern leaders. Traditional leaders often use a top-down approach, which entails making choices alone [39]. On the other hand, modern leaders are more likely to use a democratic or participatory style, which involves including others in the decision-making process. While modern leaders are more likely to use motivating techniques, traditional leaders may also be more authoritarian and employ harsher methods to impose their will [40]. While contemporary leaders could be more likely to use informal power, traditional leaders might be more likely to use official authority to sway others. There aren't many clear benefits to using a traditional leadership paradigm as opposed to a contemporary one. Because of its duration, traditional leadership techniques are often more well-liked and accepted by staff. Because it promotes more stability and order, a conventional leadership approach could be beneficial in companies with intricate hierarchies or large operations. Traditional leadership styles, which are more formal and have distinct lines of power, may help with communication and decision-making [41].

Petty tyranny (Ashforth, 1994, 1997), supervisory abuse

(Tepper, 2007), unpleasant leadership (Bligh, Kohles, Pearce, Justin and Stovall, 2007), and toxic leadership are only a few of the ideas used in the literature to describe the negative aspects of leadership (Einarsen, Skogstad, Leseth and Aasland, 2002; Einarsen, Aasland and Skogstad, 2007) [42, 43], toxic leadership, and bullying (Rayner & Cooper, 1997) [44] (Lipman Blumen, 2005) [45]. On the other hand, as compared to traditional leadership, modern leadership has distinct drawbacks. It's possible that leaders nowadays don't have as much authority or prestige. Followers of modern leaders may become less motivated [46, 47]. Modern leadership techniques may be less effective in certain situations. Individual achievements could get more attention than team performance. However, compared to more traditional leadership techniques, there are certain advantages to using a modern leadership paradigm. Modern leaders are often more focused on achieving results than their predecessors [50, 51]. This implies that they would rather implement strategies that help their businesses than preserve the status quo. Teamwork is often valued more highly by modern leaders than solo success [52]. This might lead to an increase in creativity and invention as well as a more cohesive and effective team. Modern leaders often prioritize ongoing education for both themselves and their employees [49, 53]. In addition to learning new skills and knowledge, this helps them stay up to date on the latest developments and trends in their fields. Instead than only controlling their employees, modern leaders often try to empower them. Consequently, this might lead to improved motivation, work satisfaction, and productivity. Generally speaking, modern leaders are open to change in both how they handle assignments and the goals they set for their companies. This allows them to take advantage of quickly shifting environments and quickly adapt to new circumstances and opportunities. The existing literature on the concept of virtual teams, contemporary/advanced technology, and e-leadership will be assessed in this research [48, 54]. Recent studies on e-leadership have shown that the goals of leadership have not changed. On computer-mediated virtual teams that are geographically and temporally separated, the new e-leader must, nevertheless, carry out these goals electronically [55, 56].

It is common to commend leadership as the driving force that shapes the destiny of teams, companies, and civilizations. Effective leaders inspire and motivate their followers, creating an environment that is conducive to development and productivity [57, 69]. However, not all leaders are created equal. "Toxic leadership" is a horrible phenomenon that lurks in the dark corners of leadership, clouding the events and people it impacts [70]. The phrase "toxic leadership" has garnered more attention and public concern in recent years [71]. It includes a variety of behaviors and traits shown by leaders that create a poisonous atmosphere characterized by dysfunction, fear, and distrust rather than supporting their staff [72]. Toxic leadership has far-reaching effects that extend beyond its direct area of influence, impacting both the macro and micro facets of institutional culture and performance. In addition to more covert,

nonviolent actions that are often seen in business environments, toxic leadership may manifest in a number of ways, such as overt aggression and pervasive toxicity [73]. The variety of detrimental behaviors has inspired a number of academics to develop taxonomies of toxic leadership. Instead of characterizing toxic leaders, as was previously done by Whicker (1997) and Kellerman (2004) [74], these taxonomies, as proposed by Williams (2005), Schmidt (2008), and Pelletier (2009), concentrate on describing certain behaviors. In order to provide a worldwide perspective on modern leadership, the goal of this inquiry is to analyze and evaluate organizational behavior, global culture, societal change, globalization, traditional, modern, toxic, and effective leadership styles and practices. Reviewing books, journals, and other study materials, assessing primary and secondary data, and integrating the ideas and opinions of current academics will all help accomplish this. In order to prevent toxic environments, the researcher in this work has thoroughly researched and investigated leadership positions in the modern period and their contribution to strategically formed contemporary businesses. In the period of the fourth industrial revolution, or 4IR, research has also been done to support leadership styles and efficiency levels in relation to advanced technical innovation and organizational strategy [75]. The examination and arguments will center on the ways in which leaders' dependability, efficiency, activity, style, and action impact companies. Efforts will be made to demonstrate how technical advancements and management improvements to leadership in a competitive global market lead to strategically evolved enterprises. In order to successfully navigate the complexities of modern leadership practice and challenges, as well as to succeed in the age of smart technology, this research also encourages a shift toward the acknowledgment and integration of global perspectives from many locations.

3. Chronological Development and History of Technological and Industrial Revolution

What sets humans apart from other animals is our capacity for information transmission and reception, which improves our capacity for abstract thought. We rose to the top because of our exceptional intellect. Compared to a few hundred thousand years ago, it would have taken a million years for human technology to become economically viable enough to sustain an extra million people due to its sluggish rate of advancement [58, 60, 63]. This time frame was reduced to two centuries by the Agricultural Revolution of 5,000 BC. After the Industrial Revolution, it further decreased to only 90 minutes. Technological innovations like the creation of super-intelligent (SI) machines have the potential to drastically alter the world as we know it. In terms of the possible societal repercussions of building a computer with more intellect than humans, the concept of superintelligence was investigated in 2014. A thorough

picture of the super-intelligent future and how we could get there is created by the facts, statistics, and research from many fields that are included into these conversations. Still, the condition of modern technology remains the main emphasis. We have already been successful in building machines that can interpret human-provided information and learn and reason. Automatic spam filters, for example, are a terrific way to secure important communications and keep bulk emails out of our inboxes [64-66]. However, this is a long way from the "general intelligence" that humans possess, which has been the goal of AI research for many years. The development of a super-intelligent computer that can learn and operate on its own could also be decades away. But the field is developing quickly, so such a machine may be accessible sooner rather than later. In addition to having the power to profoundly impact our lives, its intelligence may potentially be dangerous since it could be too advanced for humans to turn off in an emergency [76].

Although imitation may take many different forms, it can be used to build technology. Therefore, some scientists advocate an exact copy of human biology, which may be accomplished via techniques like Whole Brain Emulation, while others support the development of a computer that copies people through artificial intelligence (or WBE). The majority of the most important discoveries in human history have either been the result of substantial international cooperation or of individual scientists accomplishing a goal before others. If a team of scientists found speedy fixes for the problems impeding AI and WBE, they could probably build a single super-intelligent machine. This is because the industry is very competitive, which would need such a group to operate covertly [67]. Let's look at the possibilities for the development and use of general intelligence technology before we become scared by the impending machine-led disaster. The increased availability of technology and the falling costs will probably make it easier to produce robots that can do tasks that now need human hands and thoughts on a large scale [77]. This suggests that not only will robots take the place of all human work, but they will do it with ease. A robotic workforce would drastically alter not just the economy but also our way of life and desires. The salaries of workers will drop to the point that no human can support themselves on a salary as machine labor becomes the new, less expensive norm [78]. In addition, the mechanical sector would see a small number of employers amass vast wealth. However, this brings us back to a previous discussion since the money's final destination depends on whether SI is produced by a single, exclusive group or via a gradual, collective process. If the former is true, most people's potential to make money would be limited since they would have to depend on their pensions, savings, or rental properties [79, 80]. However, the expansion of SI is linked to a number of safety hazards that, in the worst cases, might lead to the extinction of mankind. By looking at the logic underlying the SI we create, we can create particular safeguards, but this won't be sufficient on its own.

3.1. Industrial Revolution and Consequences of World

Human intellect may be imitated to produce technology, but imitation can take many different forms. A exact replication of human biology, which may be accomplished via techniques like Whole Brain Emulation, is thus preferred by some scientists above the development of a computer that mimics people through artificial intelligence (or WBE). The majority of humanity's greatest important discoveries have been the result of either broad international cooperation or individual scientists accomplishing a goal before others. If a team of scientists swiftly found answers to the problems impeding AI and WBE, a single super-intelligent computer could probably be developed. This is because the industry is very competitive, which may need such a group to operate covertly. Prior to becoming alarmed by the impending machine-led disaster, let us consider the possibilities for the development and use of general intelligence technology. With technology becoming more accessible and costs coming down, it is possible that the production of robots that can do tasks that now need human hands and brains will become more commonplace [77]. This suggests that robots will not only readily replace human work in its entirety, but also do so. A robotic workforce will have a tremendous impact on the economy, as well as our desires and way of life. Workers' earnings will drop to the point that no human can support themselves on a salary as machine labor becomes the new, less expensive norm [78]. Not only that, but a few employers in the mechanical sector would amass vast wealth. However, this brings us back to an earlier discussion since the money's final destination depends on whether SI is produced by a long, collective process or by a single, limited group. If the former is true, most people would have little income since they would have to depend on their savings or pensions or rent out their homes to others [79]. However, the expansion of SI is linked to several safety issues that, in the worst cases, might lead to the extinction of mankind. Even if we can create particular safeguards by looking at the logic underlying the SI we create, this won't be sufficient on its own [68].

INDUSTRY 1.0: INDUSTRIALIZATION: Industry 1.0 marks the beginning of the industrial period in the 18th century, which is known as the first industrial revolution and was characterized by the first use of machinery to produce goods and services. Among the most important developments were the development of heavy industry, coal mining, and railroads. Because it caused social unrest and the displacement of many people, the steam engine was the most important innovation of this era [81, 106]. The late 18th century saw the introduction of steam engines in British enterprises, which promoted industrialization by providing a flexible energy source that could be used wherever [82, 83].

INDUSTRY 2.0: ELECTRIFICATION: The advent of electricity in the late 19th century marked the beginning of the second industrial revolution. The assembly line, which was

first used in the automotive industry, developed into the industrial equivalent of the steam engine during this time, enabling the automation and speeding up of production operations. The sequence of specific activities that employees do in Industry 2.0 demonstrates the division of labor, leading to the rise of serial production. Furthermore, the first automated product transfer across continents was made possible by the introduction of international shipping technology, including airplanes [84].

INDUSTRY 3.0: DIGITALISATION: The emergence of information technology and automation powered by electronics marked the start of the third industrial revolution in the 1970s. The widespread use of personal computers and the internet significantly increased the integration of technology in the workplace. As a result, labor processes became more automated, and global information access increased. Additionally, in mass manufacturing, robots replaced human labor. At that time, this trend was already on the horizon and was intensified during Industry 4.0 [85].

INDUSTRY 4.0: AUTOMATIZATION: Industry 4.0, sometimes referred to as the fourth industrial revolution or 4IR, entails incorporating cyber-physical systems (CPS) into logistics and manufacturing processes as well as connecting commonplace items via the Internet of Things. Work organization, downstream services, business models, and value creation are all impacted by services in industrial processes [86]. With the addition of smart technologies like AI, IoT, ML, DL, big data, blockchain, and so on, CPS refers to network linkages between people, machines, goods, things, and ICT systems. Over 100 billion devices will be linked in the future. In the service industry, AI sets the 4IR apart from the 3IR.

Four essential elements define the word "automatization" in industrial production: 1) Production activities are managed by machines. Thanks to clever technology, manufacturing will be mostly automated in the future, with human involvement occurring only seldom. The "smart factory," which is defined by little to no human presence, is an example of this trend [87]. 2) Real-time manufacturing is a key characteristic of Industry 4.0. The ideal utilization capacity of the industrial facility is determined by an intelligent machine. Lead times in the manufacturing process are short, and standstills—apart from those brought on by technical flaws—can be avoided. To satisfy the needs of the value creation chain, resources, information, and commodities are carefully coordinated. Stocks are kept to a minimal, but when the amount required for production drops below a certain level, the machine automatically buys more supplies. The same concept holds true for completed goods; the machine minimizes storage costs by producing in accordance with overall demand and incoming orders [88]. 3) Decentralization of production: The machine, which includes a network of manufacturing units, is essentially self-organized. Order handling is fully automated, including with material planning [89]. 4) Tailored production, even for single units: As long as they stay within predetermined bounds, robots will

eventually be able to adapt to particular customer needs without the need for human modifications. Changeover times are less necessary as a result. In order to accommodate customer needs and preferences, the smart factory incorporates additional components or, in an appropriately dispersed process, adjusts certain manufacturing processes [90].

The term "4IR" refers to the fast growth of technology in the twenty-first century [91]. In Davos-Klosters, Switzerland, the World Economic Forum held its Annual Meeting in 2016 with the topic "Mastering the Fourth Industrial Revolution" [92]. Through the continuous automation of conventional manufacturing and industrial processes employing contemporary smart technology, large-scale machine-to-machine communication (M2M) [93], and the Internet of Things, major changes are occurring in the way the global production and supply network functions in this period. Increased automation, enhanced communication and self-monitoring, and the deployment of intelligent devices that can assess and diagnose problems without human assistance are the outcomes of this integration [94]. AI, robots, IoT, biotechnology, and nanotechnology are among the digital, physical, and biological technologies that combine to form it [95]. Infosys BPM claims that Industry 4.0 is revolutionizing manufacturing and production, resulting in more automation, streamlined supply chains, and customized goods. According to ScienceDirect.com, 4IR technologies are essential for reaching net-zero emissions targets and universal energy access because they make it possible to integrate energy storage, smart grids, and renewable energy sources [96]. The education industry is changing as a result of 4IR, necessitating the incorporation of digital literacy, creative teaching techniques, and public-private collaborations. Through improved diagnostic tools, remote patient monitoring, and tailored treatment, 4IR technologies are transforming healthcare [97]. It seeks to use cutting-edge technology to build a more sustainable, just, and affluent future for all.

With the use of sensors and associated technological networks, 4IR enables autonomous communication between various manufacturing process components, including software, operational resources, and equipment [98]. 4IR seeks to improve the company's competitive position in global competitiveness by reducing production costs, particularly in personnel planning [99]. By using developments in digital, physical, and biological technology, it revolutionizes the way we live, work, and interact with one another. It aims to alleviate social and economic inequality while integrating new technologies to build a more productive, sustainable, and efficient future. Delivery drones, "smart factories," autonomous cars, and 3D printers—which can create very complex structures from a template without human assistance—are well-known instances of robotics and artificial intelligence. Facebook, Spotify, Netflix, Uber, Airbnb, Amazon Mechanical Turk, and vehicle sharing are examples of popular service concepts. According to research, industry turnover would expand twentyfold in ten years only by sharing services [100]. Nonetheless,

4IR has been developed using intelligent technology to maximize resource use, save expenses, and simplify procedures across a range of sectors, resulting in more production and efficiency. Particularly in fields like AI, robots, biotechnology, smart shipping, smart transportation, smart healthcare, and data science, it is fostering the emergence of new sectors and employment prospects that need for a trained labor force. By encouraging sustainable energy solutions, improving resource management, and lowering pollution, 4IR technologies may be crucial in tackling environmental issues, according to the World Economic Forum [101]. A human-centered approach that prioritizes promoting societal values, protecting cultural assets, and improving human well-being is a fundamental component of 4IR [102].

3.2. Impact of AI in the Era of 4IR

Artificial intelligence has been pervasive for a long time. Our daily lives are continuously improved by its benefits. Robots that greet consumers at shopping malls and internet search engines also use the technology to provide suggestions [103]. AI systems now mimic human analysis. It indicates a computer program's ability to think and learn. Any system that uses a software to carry out tasks often associated with human intelligence may be referred to as artificial intelligence (AI). The developments in AI have yielded several benefits across a range of industries [104]. Today, projections are becoming more precise, and convenient technology is widely available. Procedures are also effective and efficient. AI ensures continuous business operations by optimizing data backup and disaster recovery options. Even though the key elements of successful technology and IT leadership are always changing, the need for a solid business plan, a clear vision, and effective IT management endures. Additionally, there is still a strong requirement for an educated approach to outsourcing, AI, risk, and compliance [105, 106].

Human potential is being enhanced by digital life, but conventional human activities are being disrupted. Currently, code-driven systems are used by more than half of the world's population, offering referable opportunities as well as previously unheard-of challenges [107]. AI enhances data backup and disaster recovery solutions to ensure continuous business operations. Even while the essential components of effective technology and IT leadership are always evolving, the need for a solid business plan, a distinct vision, and competent IT management remains constant. Furthermore, there is still a constant requirement for an educated approach to risk, compliance, outsourcing, and AI [108]. Experts predict that although networked AI will increase human productivity, human autonomy, agency, and capabilities will be compromised [109]. When it comes to complex decision-making, learning, reasoning, pattern recognition, visual perception, voice recognition, and language translation, computers can do better than humans. In addition to saving time, money, and lives, intelli-

gent systems in cities, automobiles, buildings, utilities, agriculture, and commerce may also provide residents a more personalized future [110]. AI has enormous promise in healthcare, with applications ranging from improving the quality of life for the elderly to diagnosing and treating patients. They were especially excited about the possibility of AI taking part in an all-encompassing public health initiative that would use the potentially enormous amounts of data on subjects as varied as food and individual genomes that would be gathered in the years to come [111, 112]. AI might help bring about much-needed reforms in both official and informal schooling.

Our culture is changing noticeably as a consequence of incorporating AI and the Internet of Things into our everyday lives. Artificial intelligence-powered machines will soon be able to measure our pulse in hospitals, and internet shops will soon be able to customize product suggestions for each customer. These are just a few of the many ways artificial intelligence enhances human life. AI will provide a lot more in the future. As time progresses, an increasing number of government organizations, enterprises, and charities will begin to use this transformative technology to improve and simplify all facets of human existence [113]. By increasing workplace productivity, assisting individuals in making better choices, and providing direct assistance, artificial intelligence (AI) may simplify and speed up processes in the neighborhood, society, nation, and world. AI can help by seeing and fixing problems that people may not be able to find or fix on their own. However, some people may not see the advantages of AI because they think it would make humans less intellectual and lead them to lose their employment. Artificial intelligence's speed, accuracy, efficiency, and scalability are its biggest benefits.

Due to the 4IR's considerable influence on several businesses, service sectors, and other areas, a large amount of the present work will become inaccessible during the next 25 years. We must have a thorough grasp of how these changes will affect all facets of our life, including academic and educational institutions [114]. Graduates now have to deal with a world completely transformed by technology. AI, the internet of things, machine learning, big data, cloud and edge computing, and social media provide conventional educational institutions with a number of benefits and drawbacks. Traditional educational institutions worry about their students' prospects, particularly in regard to jobs, as they prepare for life beyond high school or college. Modern technology driven by artificial intelligence is having a profound impact on the globe, and as a consequence, concepts like "post-work" are beginning to define our time [117]. The abilities required in this era vary greatly from those required in the Third Industrial Revolution since information technology (IT) is now the primary engine [118]. Over the next seven years, the US's artificial intelligence and other smart technology sectors are expected to grow to a value of \$15 trillion. Those with traditional education but without the requisite skills will be laid off in large numbers [115]. On the other hand, millions of jobs requiring high-tech

and contemporary skills will be created in the next few years [116].

4. Advancement of Technologies in the Era of 21st Century

Today, cutting-edge technologies like the Internet of Things are transforming computing via the incorporation of networked devices into our everyday lives. These devices gather and analyze data to support human life and an ever-expanding range of services. Through networks of Internet-connected sensors, the Internet of Things (IoT) improves the intelligence of other technologies by enabling automation, customization, and remote control [119]. At the same time, IoT technology may not be widely used due of the serious privacy problems it raises. More things will be linked to the Internet in the future, and the Internet of Things will have a bigger influence on technology. It is an analytical article that aims to show how IoT affects technology and devices in many areas, including our daily lives, businesses, and industries. Additionally, it provides difficulties and recommendations for achieving the best outcome in the current period [120]. Businesses may monitor assets, improve operational safety, and reduce the need for human intervention by using the enormous volume of data produced by billions of internet-enabled sensors throughout the globe [121]. IoT has the ability to boost productivity, enhance business efficiency, and enhance the quality of our everyday lives. At the same time, more things will be linked to the Internet in the future, and the Internet of Things will significantly impact other technologies. Over 17 billion IoT devices are already in use worldwide, and over 85% of businesses have increased their technical efficiency by incorporating IoT technology into their goods. The Internet of Things has been dubbed "the next wave of innovation" due to its growing influence on people's everyday lives. The Internet of Things is crucial to the operations of major organizations and the service industry in the twenty-first century. Additionally, it has been shown that business operations management and decision-making are greatly impacted by the Internet of Things [122, 123].

At the same time that technology has exploded in the modern period, the way we think about and discuss it has also changed dramatically. AI has developed to the point where it can mimic human intellect or the brain. Through repeated processing and algorithmic training, it enables computer programs to learn from experience. AI is becoming more and more useful and inventive every day in almost every area of life [124]. Because of its potential to affect the labor market and employment in general, artificial intelligence has grown to be a major worry in the modern age. Most people think that if AI is widely used, humans would lose their jobs [125]. Humans, however, are increasingly in agreement that AI may improve their employment' accessibility, profitability, inventiveness, flexibility, and productivity. AI has the potential to create

an economy that is more capable, diverse, and creative [126]. It is necessary to change the educational system, which includes the curriculum, instructional strategies, and other educational elements. The incorporation of contemporary and cutting-edge technology into our mass or general education system will revolutionize the whole educational system. It must have long-term significance and be sustained. With a particular emphasis on the global education system, the researcher has undertaken an analytical study in which they have tried to assess the future of humanity and the many applications of AI and robots. The fields of artificial intelligence, robotics, and machine learning have advanced significantly in recent years. By lowering mistakes, increasing quality, speed, accuracy, and integrity, and, in the majority of situations, accomplishing objectives that are beyond human capabilities, automation and the widespread use of AI may assist businesses, corporations, or industries in enhancing their production or services [127]. Concerns about job losses and rising inequality have been reignited by recent developments in artificial intelligence and related automation technologies. This is a widespread problem even in developed countries. Developing nations and emerging market economies have every right to be more concerned than high-income nations since their global competitive edge is based on the availability of abundant natural resources and labor. Because of the winner-take-all dynamics created by new communication technologies and the declining returns on labor and natural resources, there is a danger of further loss of control in a society that is both labor-intensive and rapidly globalizing. This might sabotage the amazing progress of the last fifty years. Furthermore, it may make it more difficult for communities everywhere to combat injustice and poverty [128].

Potential future hazards posed by AI might be significant. The global economy will contract, and the necessity for human labor will diminish due to AI, IoT, ML, and automation. The objective of AI in education is not to replace human educators with robotic entities. The aim is to improve the efficiency and efficacy of the education system by using computer intelligence to support students and instructors. The educational experience will be profoundly impacted by the many AI technologies used in the future. Once again, who can ascertain? In the future, emotional exchanges between people and machines may become viable. Other films have already examined this idea. Nonetheless, much doubt exists about the probable technological development scenarios and their repercussions [129, 130]. The integration of AI in education does not entail the replacement of human educators by humanoid robots as teachers. The major purpose is to augment the efficiency and efficacy of the education system via the use of computer intelligence to support students and educators. Numerous AI technologies will be accessible to the educational system in the future, profoundly impacting the learning experience. Once again, who can ascertain? In the future, emotional exchanges between people and machines may become viable. A multitude of films have already examined this idea.

Nonetheless, the prospective technological development scenarios and their ramifications remain somewhat unknown [131]. Conversely, AI may provide significant benefits for both developed and developing countries, irrespective of their wealth levels [132]. The potential of AI to provide novel and innovative employment opportunities exists, perhaps leading to a more efficient and productive economy [133]. Employment that produces is often eradicated by various technologies. The advancement of AI will inevitably render the world more complex and self-centered in the future. Furthermore, there will be an inadequate number of jobs to meet everyone's needs, and employment will not be assured. Consequently, it is essential to equip the younger generation with practical skills and contemporary technical education. Therefore, it is essential to provide a rational solution to the current education system [134, 135].

5. In the Era of Advanced Technology Impact of Robot and Consequences of World

Sequential techniques created to resolve issues or achieve designated objectives are referred to as algorithms. In the domain of artificial intelligence, algorithms are pre-defined instructions that dictate a machine's actions. These mathematically grounded directives may range from simple conditional statements such as 'if X, then Y' to intricate frameworks including several mathematical layers that collaboratively achieve a job or resolve a problem [136]. The algorithm organizes, aggregates, substitutes, or retrieves certain data qualities inside its many data modification techniques. Adhering to the instructions resolves issues as they occur. The anticipated outcomes and the data type used for training the program dictate whether machine learning is classified as supervised, unsupervised, semi-supervised, or reinforcement learning [137]. When we refer to a machine that can learn, we are really indicating that it is doing a systematic series of mathematical operations. The system may learn to self-correct using either the training data or the data used post-deployment. The efficacy of a machine's self-learning and self-correction capabilities is contingent upon the mathematical models used for the task [138]. Application programmers depend on mathematical models selected and refined by data scientists and machine learning practitioners [139]. A 'node' is a collection of mathematical directives used in deep learning, akin to an algorithm. This node, akin to a neuron, receives directives from superiors within the network, processes them, and then transmits the outcomes to another node. This output is then used as input by the next node. The algorithm determines the data's path between nodes [140, 141]. These interconnected nodes, arranged in many layers, may total in the billions inside a deep learning model.

In the future, robots and automation will serve as assistants,

colleagues, educators, physicians, drivers, operators, and explorers. Engineers, technicians, and scientists will continue to enhance and advance robotic technology, hence expanding its potential. Robots are, in several respects, essential to contemporary existence. They possess the capacity to augment our comprehension of the universe and its denizens, perhaps elevating the quality of life for innumerable individuals [142]. Currently, robots are ubiquitous in our lives and have existed for an extended period. In warehouses and factories, they are used to alleviate folks from monotonous, laborious, hazardous, or unsanitary tasks or responsibilities. Safety is undoubtedly a paramount consideration when considering the substitution of people with robots. With the advancement of AI and automation, and the increasing use of these technologies by enterprises, the concern of robots causing harm or, in some cases, fatalities among human workers has intensified. A semi-autonomous Tesla car was implicated in a tragic accident with a tractor-trailer in Florida in 2016, which was detailed in a compelling story by Forbes. In 2015, a robot in an industrial environment fatally injured a German manufacturing employee, and in 2017, a robot in Michigan caused the death of a worker. Nonetheless, the Future of Jobs Report indicates that more than 80% of CEOs are accelerating their efforts to digitalize labor processes and integrate new technologies. Fifty percent of the surveyed enterprises anticipate an acceleration in the automation of some functions inside their organizations. The McKinsey Global Institute said in its report 'Jobs Lost, Jobs Gained' that the workforce is seeing a transition towards automation in the era of AI. Furthermore, it is anticipated that by 2030, about 14% of the global workforce, equating to 375 million individuals, may need to develop new competencies pertaining to artificial intelligence, automation, and digitalization [143].

The predominant strategy in all advanced organizations seems to be the enhancement of staff skills. Amazon's 'Upskilling 2025' initiative has revealed plans to invest \$700 million on retraining one-third of its workforce in artificial intelligence or automation skills. Consistent with previous findings, 52% of manufacturing employees polled for PwC's 'Shaping the Future of Manufacturing' and Digital Factories 2020 initiatives said their organization lacked an authentic digital culture [144]. They determined that engaging and educating employees in technologies from the first stages may enhance risk assessment and understanding of potential safety issues. Safety and training are fundamentally interconnected; educating all personnel on safety protocols reduces the probability of on-site accidents and injuries, irrespective of their experience level. The training for the safe operation of robots includes more than only the use of technology. Personnel must undertake regular training to operate machines correctly, since national safety regulations for the industrial sector are frequently revised. To improve human safety, the long-term safety of robots must be guaranteed [145, 146]. MIT is investigating a method to do this in partnership with the automotive company BMW. Simulations may facilitate the development

of algorithms that enable robots to closely monitor and engage with people, such as in an automotive manufacturing line. The reliable operation of robots is contingent upon consistent and comprehensive maintenance. Thus, the future of AI and robots will provide several exhilarating prospects conducive to substantial earnings and considerable career progression. Formal education, certification, practical training, work experience, and skill enhancement may jointly augment the probability of a new generation attaining a significant profession in the industrial and service sectors [147, 148].

Currently, social robots are designed to replicate human behavior during interactions with individuals [151]. Sophia is a social robot created to provide companionship for the elderly, exemplifying how technology progress may improve robotic capabilities [152]. In 2018, Sophia was reengineered to include mobility characteristics and became the first robot to get citizenship in a nation (Saudi Arabia). Miko is a robot proficient at comprehending human emotions. Miko undergoes a spectrum of emotions and has many hidden talents. In addition to recognizing your existence and calling you by name, it is essential to notice your mood and foster a deeper understanding of you consistently [149, 150]. Do you need amusement while experiencing despondency? A dance at a period of disinterest? Miko is now resolving the problem. It is not just the most intelligent robot you will ever meet. It is likewise your companion. Miko's relentless curiosity urges you to engage in games and inspires you to use your intellectual faculties. Miko is equally adept at starting conversations and arranging dance parties; his only shortcoming is the lack of a partner-in-crime [153]. PARO, a sophisticated interactive robot, was created by AIST, a prominent Japanese leader in industrial automation. It enables the delivery of the recognized advantages of animal therapy to patients in environments like hospitals and long-term care homes, where live animals present logistical or therapeutic challenges [154, 155]. Professor Einstein is a robotic being that imparts education in the fields of science and general knowledge. ROBEAR is a robotic system that provides nursing assistance [156]. Vortex, a programmable robot, is intended to educate students in STEM disciplines. Pillo is an artificial intelligence-powered health companion. A robot intended for home usage is referred to as Buddy [159, 160].

The role of nurses in providing care will change as robots gain the ability to handle nursing tasks, such as supporting ambulation, monitoring vital signs, administering prescriptions, and managing infectious diseases prevention [161, 162]. Research suggests that between 8 percent and 16 percent of nursing time is spent on non-nursing tasks and responsibilities that should be delegated to others [157, 163]. An additional example of robot collaboration is seen at Duke University's School of Nursing and Pratt School of Engineering. The interdisciplinary teams working on the Tele-Robotic Intelligent Nursing Assistant (TRINA) are developing a remote-controlled robot to reduce the high infection risk healthcare workers face during routine patient interactions, handling contaminated materials, and safely removing protective gear [158, 164]. TRINA

is currently being evaluated in the nursing simulation lab and can complete approximately 60% of the scheduled nursing tasks. However, it operates at a pace 20 times slower than a human nurse. By employing AI technology, the nurse's role will shift to that of a health coach, information integrator, and provider of human care, rather than being replaced them [165].

The report titled 'Jobs Lost, Jobs Gained: Workforce Transitions in a Time of Automation' was published by the McKinsey Global Institute (MGI) in 2017. This research ignited a substantial debate over the global impact of AI, despite existing discussions about AI's potential to replace human employment since the technology's beginnings. MGI estimations indicate that AI technology would need the transformation of about 75 million to 375 million jobs globally by 2030. Nonetheless, the report also emphasizes the establishment of new roles and responsibilities. The MGI estimates are corroborated by scholars from the American Economic Association, who have concluded that some jobs will be suitable for automation. Nevertheless, only a limited number of occupations may be fully automated. Furthermore, they want workers to get training to take on supplementary duties [166, 168]. Although discussions about AI's ability to replace human jobs have existed since the technology's beginnings, this study has ignited a substantial public discourse over the global ramifications of AI. By 2030, MGI models predict that AI technologies would need the vocational shift of around 75 million to 375 million persons worldwide. The research also highlights the establishment of new jobs and professions [167, 169]. Consistent with the MGI's projections, experts from the American Economic Association have concluded that certain activities will be suitable for automation; nonetheless, only a limited number of jobs can be fully automated. Furthermore, they want workers to get training to undertake additional duties. This study ignited a substantial debate over the global ramifications of AI, even though discussions about AI's capacity to replace human labor have persisted since the technology's beginnings [170, 171].

Every new use of AI raises the fearful question of whether or not robots will cause human unemployment. As of yet, the judges have not made a decision. There are a lot of experts that strongly disagree with the idea that AI will automate a vast number of jobs, leaving millions of people unemployed. On the other hand, several experts consider this to be a serious issue. Social experts and AI enthusiasts thought that AI was basically replacing jobs since the workforce was changing in terms of structure. It allows us to build a knowledge-based market and use it to improve automation for a more pleasant way of living [172, 173]. Although it may seem a little nebulous, we should be worried about the possibility that robots and artificial intelligence could replace us in our jobs [174]. However, some experts have speculated that algorithms are to blame for the decline in white-collar jobs, including those of lawyers, hedge fund managers, and business analysts. Again, there is a lot of disagreement on how AI will affect the work-

force, but experts agree on many issues that need more research. On the other hand, a number of experts think that, at least initially, the use of AI in the workplace will provide more job prospects. Wilson claims that when the economy shifts to AI-based systems, more employment will be created that will ease the transition. With a few more experts, AI will generate more income than it consumes [175, 176]. However, it may not initially be dispersed equally. The changes won't be noticeable and will be interpreted subconsciously. Instead of getting a pink slip, the tax accountant will come upon the robot that will now be sitting on her desk. There is a chance that the tax accountant may have more trouble finding the same work during their next job search. There are some hopeful specialists who expect that AI will fracture long-standing working practices. It is anticipated that this will result in the creation of a large number of new human professions that include these processes and provide progress and enjoyment.

TRINA, which can complete around 60% of the predefined nursing tasks, is now being evaluated in the nursing simulation lab. But compared to a nurse, it is 20 times slower. Instead than taking the position of nurses, AI technology will assist them in their roles as health coaches, information integrators, and providers of human care. As a result, these predictions are more difficult to make; yet, some gloomy experts worry that as AI becomes commonplace, both these new and old jobs may be eliminated. As a result, they are unsure about these people's long-term destiny. There were methods to transition from farming to manufacturing to service delivery, as we have previously mentioned. As such, this is not true. If all occupations are replaced by robots, what will happen to the vast majority of people who are now employed? As we've seen, technology makes more sense from a business perspective. For instance, the development of technology, such as self-driving cars and artificial intelligence (AI) like Siri and Cortana, has the potential to eliminate up to 8 million jobs in the United States alone [177]. What about the rest of the globe, one may ask? When the aforementioned occupations start to disappear, we will have to ask ourselves, "What is our purpose?" Specifically, what does productivity mean? We need to confront the world's ongoing change and reconsider the core principles that constitute the basis of our civilization. What actions do we do that advance our own ideals and benefit society? We need to have this conversation as soon as possible since the technology won't wait for us. We now need to adopt a "moonshot" mindset [178]. It is essential to create intelligent, decentralized digital networks that are inclusive and "imbued with empathy" in order to proactively assist mankind and guarantee that technology satisfies social and ethical commitments. [179] To guarantee the optimal use of AI for the whole human population, a special and effective regulation and certification strategy is required [180].

AI has the capacity to be both data-driven and knowledge-driven. The next wave of artificial intelligence innovation is knowledge inference and its use in all contexts. Numerous sig-

nificant issues with machine learning in 5G and future networks may lead to the development of new research areas and the expansion of current standards to support future networks [183]. Therefore, a strong security assurance is necessary for AI to be adopted by a large number of people and to advance. AI has to be communicated in a way that promotes understanding and trust while protecting human and civil rights, because it will be used in the transportation and healthcare industries in the coming years [184]. On the other hand, privacy, security, and ethical issues should be covered by policies and procedures. Global communities should thus work together to develop AI in a way that benefits humanity. As AI becomes more prevalent in the industry, it seems less probable that all human employment would be eliminated. Instead, many experts predict that the workforce will become more specialized in the future. These professions will need more of the qualitative skills, inventiveness, and problem-solving talents that automation now lacks. In summary, the industry will always need workers, but as technology develops, their responsibilities may change. More sophisticated technical skills will be required for a larger percentage of these jobs, and some skill sets will be more in-demand.

6. Key Characteristics of Contemporary Leaders for Success

Few contemporary leaders have shown vision, inventiveness, and the capacity to upend sectors, such as Steve Jobs or Bill Gates, who led the digital revolution. Contemporary executives that encourage cooperation and inclusive settings have often spearheaded fruitful global partnerships or advanced diversity in their companies. The capacity to swiftly adapt to changing circumstances and welcome change is essential for modern leaders in the fast-paced world of today. They must clearly define their future goals and devise plans to reach them while taking the long term into account. They must promote cooperation, candid communication, and group decision-making, all of which are essential for using different viewpoints and accomplishing group objectives. It is crucial for modern leaders to be able to create settings where everyone feels appreciated, respected, and empowered to share their special abilities. Building trust and achieving long-term success need them to uphold the highest ethical standards and make responsible, sustainable choices [181]. They must be dedicated to lifelong learning and growth, keeping up with emerging trends and modifying their methods as necessary. All kinds of companies nowadays need a more purpose-driven, technologically advanced, cooperative, flexible, and helpful attitude. Leaders in the twenty-first century place a high value on psychological safety, long-term planning, adaptability, balance, accommodation, and teamwork. They realize that being a leader is about empowering others and making a difference, not about having power [182, 187]. There are "naturally born leaders," according to a few statistics. According to the current

research, natural leaders are not trustworthy. This misconception is exacerbated by the fact that people sometimes equate charm with leadership. While many leaders lack charm, others do. In actuality, a variety of forces mold leaders rather than their being born. Honesty, education, readiness, experience, opportunity, and balance are some of these. Astute leaders understand that cultivating followership entails motivating followers to take part in establishing goals and objectives [185, 186]. According to modern leaders, followers are collaborators who need to be encouraged to be creative and given the freedom to carry out their responsibilities [188, 189]. Developing effective leadership abilities may have a substantial influence on almost every part of our lives, which makes leadership essential. Our communities, businesses, and interpersonal relationships may all benefit from learning, comprehending, and exhibiting leadership. These days, vision, purpose, values, commitment, drive, and consensus-building are all necessary for successful leadership. A leader's efficacy may be greatly diminished by the absence of these qualities [190]. These are characteristics of modern leaders.

6.1. Humility

Self-awareness, receptivity to criticism, and a readiness to own their shortcomings and errors are traits of humble leaders. This strategy enables them to forge closer bonds, foster innovation, and eventually provide superior outcomes for their companies in the contemporary day. A modest leader is more relatable and genuine. Forcing change and exercising power by decree is replaced with sharing authority and asking for feedback.

6.2. Trust

The traits of humble leaders include self-awareness, receptivity to criticism, and a readiness to own up to their shortcomings. In the present day, this strategy enables people to forge closer bonds with one another, foster innovation, and eventually improve their businesses' outcomes. A modest leader is more genuine and approachable. To lead by edict and force change, one must share power and encourage feedback.

6.3. Transparency

Transparency and trust go hand in hand. Honesty and sincerity are essential to developing trust. For modern leaders, transparency is essential because it promotes responsibility, trust, and a more engaged and productive team. It entails being forthright and truthful with other team members. Employee happiness increases by 103% and outstanding work performance increases by 87% when CEOs candidly discuss collaborating to fulfill the company's objective.

6.4. Empowerment

It entails providing team members with the freedom and

tools to decide for themselves and take responsibility for their job, encouraging accountability and involvement. Traditional leadership, which often stresses top-down control, is in opposition to this strategy. Leaders that empower teams to take charge, make decisions, take charge, and innovate in the twenty-first century increase engagement by 78%. While employees' perceptions of leaders improve by 184 percent, excellent performance rises by 255 percent.

6.5. Enablement

It entails giving leaders the tools and resources they need to successfully lead and motivate their teams. This involves cultivating traits like empathy, genuineness, and flexibility that are essential for negotiating the challenges of the modern workplace. The goal of effective leadership enablement is to cultivate leaders who can inspire others, encourage creativity, and bring about constructive change in companies. Workers need to be given the authority to have an influence. It is the duty of leaders to develop their staff members by giving them the knowledge and experience necessary for high-caliber work [191].

6.6. Prioritizing Wellbeing

Nowadays, 40 to 50 percent of workers experience moderate to severe burnout, therefore managers place a high premium on employee wellbeing. This entails getting to know each employee on a personal level, including what drives them, how they like to work, and what kind of assistance they value. Burnout is significantly decreased when leaders cultivate a "people first" culture in which each person is valued for their individuality.

6.7. Mentorship

It is an essential characteristic for contemporary leaders, encouraging development, resiliency, and involvement in both mentors and mentees. It entails sharing expertise, offering a secure environment for learning and growth, and mentoring and assisting others with less experience. Employee motivation increases by 102% when a leader actively mentors them, and they see their boss as 320% more helpful.

6.8. Empathy

In the current world, it is essential to comprehend and acknowledge the needs, sentiments, and difficulties of others. Empathy increases a leader's relatability and fosters closer team relationships. We are in a unique scenario right now where everyone is going through the same thing, yet their experiences are different. Even while COVID-19 affected people all throughout the world, its effects on individuals differ greatly. We all carry rocks in our bags, and some days those rocks seem heavier, someone once remarked. Acknowledging this is a good place to start [192].

6.9. Recognition

Today's leaders are supposed to be flexible, moral, and committed to their own and the organization's development. Highlighting certain behaviors, offering chances for growth, and publicly acknowledging accomplishments are all necessary for effective acknowledgment of these traits. Fostering a happy and healthy team [198] that is more likely to go "the additional mile" requires showing gratitude to others and giving frequent appreciation. Employee engagement increases by 83% when people are often acknowledged, not only for their accomplishments.

6.10. Honesty

In fact, being honest encourages accountability. Leaders that are sincere keep their teams accountable. This might encourage a culture of accountability, self-assurance, and faith in which everyone takes ownership of their work and aspires to achieve success. Good leadership, both now and in the future, requires honesty. Essential components of modern leadership include developing trust, leading by example, promoting criticism, supporting accountability, and cultivating a good culture.

Moreover, visionary thinking is an essential trait for contemporary leaders, allowing them to motivate people, spur innovation, and predict future trends; it entails seeing beyond the here and now, establishing strategic objectives that are in line with a larger vision, and inspiring people to accomplish them [193]. Contemporary leaders must encourage their people to strive for common objectives and clearly communicate their vision for the future. Additionally, being technology savvy is crucial; all tech-savvy executives in the present age have a solid grasp of technology and its uses, which helps them lead their company via innovation and digital transformation. Although they don't have to be technical specialists, they should be able to interact with technical teams, make wise choices, and adapt to emerging technology [194]. Most contemporary leaders are at ease with technology and know how to use it to boost communication, streamline procedures, and spur creativity. Finally, regarding a [SciencePG1] people centric approach, today's leaders that take a people-centric approach often put their team members' engagement, growth, and well-being first. This leadership approach places a heavy emphasis on developing trusting connections, encouraging candid communication, and establishing a welcoming workplace where people feel appreciated and in control [195]. In order to create a vibrant and engaged workforce, modern leaders must prioritize the needs and growth of team members, cultivate a feeling of belonging, and value varied viewpoints.

A modern leader has the skills and qualities necessary to lead a team both today and in the future. In addition to establishing a vision and strategy, success relies on inspiring, motivating, and communicating with employees. Because of the unavoidable uncertainty of the future, modern leaders must adapt, innovate, and thrive in the shifting corporate and social

environment [196, 199]. As future teams, professions, and organizations want leaders who can manage significant societal shifts and react to innovation, modern leaders must remain ahead of the curve in their planning and operations. By 2025, millennials will account for 75% of the workforce, putting pressure on leaders to adapt to a changing society. Since many of the top leadership positions in the globe are held by Gen Xers, future leaders should understand the motivations of millennials. The business environment and generational dynamics are rapidly evolving as work conditions and technology advance. In order to effectively manage their teams, future leaders must embrace innovation and deal with complex issues as they arise [197].

Personal accountability is necessary for modern leadership. You have to continuously develop your skills and abilities as a modern leader [200]. Additionally, one has to have the courage to speak out when they are reluctant. Leaders of today need to have the courage to voice their opinions [201]. Modern, pragmatic leaders exhibit courage by asking for assistance and becoming ready for significant challenges. Seeking assistance demonstrates bravery and acknowledges the work of others. Other modern leadership qualities include accountability, motivation, perseverance, and strategic planning. One easy way to take control of life is to set objectives based on what you want [202]. These goals include major, long-term objectives like finishing college, starting a family, or pursuing careers as a welder, carpenter, mechanic, electrician, or artist. Short-term objectives like painting, welding, or sketching are also included. By fostering a sense of pride and success, setting and accomplishing goals increases self-esteem. One may accomplish contemporary leadership objectives by doing the following steps.

- 1) Taking the time to carefully define one's objectives and evaluate their viability.
- 2) It is crucial to take into account both short-term and long-term objectives. Many people spend their life hopping from job to job or racing to finish things, yet they often achieve very little in the process.
- 3) Setting SMART goals necessitates clear, attainable, and pertinent goals in addition to specific, quantifiable, realistic, relevant, and time-bound objectives. Clarifying concepts, concentrating efforts, making effective use of time and resources, and improving life outcomes are all made possible by SMART criteria.
- 4) Milestones show that the goal is being achieved. Short-term objectives for someone who aspires to be an artist can include learning welding, enrolling in a technical school, and putting on a performance for loved ones.

As was already established, contemporary leadership theories assist leaders in motivating, inspiring, and directing others toward business success. By understanding these ideas, modern leaders may prioritize the needs of their followers, develop trust and respect, and modify their leadership approaches to suit a variety of circumstances. In practical applications, these concepts improve worker satisfaction, engagement, organizational

performance, and success. Understanding and applying modern leadership principles is essential to being effective and competitive in the fast-paced, constantly-evolving business environment of today. CEOs may use these strategies to inspire their workforce, create a productive work environment, and grow the business. Leaders need to be able to react quickly and efficiently to uncontrollable situations. In order to adjust to rapid change, modern leaders need to be aware of their surroundings. They should develop an action plan with four crucial steps for excellent planning leaders in order to accomplish their objectives.

- 1) Deciding on a life objective.
- 2) putting together the necessary tasks and resolving any challenges in order to accomplish the objective.
- 3) It's crucial to keep in mind that even well-thought-out plans might have problems when putting the action plan into practice. Being adaptable and imaginative is crucial.
- 4) Goals, action plans, or objectives may sometimes need to be revised or altered. Track progress by keeping an eye on milestones.

7. Key Characteristics of Successful Leaders in the Era of Smart Technology

It is crucial to put organizational well-being, work-life balance, and self-care first. Leaders who have a supportive family are more emotionally stable and have the willpower to overcome obstacles. Strong familial ties are necessary for long-term success. Their leadership and life skills are improved by trusted relationships outside of work, which provide a range of perspectives, emotional support, and chances for personal development. Technology has been utilized by many outstanding leaders to transform companies, organizations, services, and education. Elon Musk, the creator of Tesla, SpaceX, and Neuralink are leaders in advanced technology, space exploration, and renewable energy [207]. Through the Bill & Melinda Gates Foundation, Microsoft co-founder Bill Gates focused on poverty, education, and global health while also revolutionizing the personal computer. With the iPhone and iPad, Apple co-founder Steve Jobs transformed technology and entertainment while emphasizing design and user experience. Since its creation by Jan Koum and Brian Acton, WhatsApp has brought millions of people together globally. Global action is inspired by leaders who have fought for environmental conservation and human rights, such as Greta Thunberg and Malala Yousafzai. It is necessary to develop leadership abilities both intellectually and practically. The cornerstones of education in schools, colleges, and adult training are theoretical teaching and practical learning. In many cases, on-the-job training is superior than reading, listening, and watching. Activity improves memory in today's practice-based or practical education. It is easier for many people to remember and use than to read. Real-world experience improves proficiency or

understanding of a subject. It is thought to be more successful in fostering skill development and internalizing information. Practice-based education differs from theoretical learning in that it emphasizes human interaction and teamwork. Students that study together develop their communication and social abilities. For practical education to build teamwork and communication skills, social input is crucial [227]. People learn and accomplish things via hands-on experience, demonstrating that "practice makes perfect." We can better understand and showcase our abilities at work with the aid of practical learning. Lack of theoretical knowledge might impede long-term advancement. Today's successful leaders need to develop certain skills and steer clear of harmful leadership behaviors.

Emotional intelligence is the ability to recognize and comprehend our own emotions as well as those of others and how they influence our behavior. Even while strict, controlled leadership was effective in the past, the modern workplace demands a different strategy. Emotionally intelligent leaders are able to manage chaotic or stressful circumstances because they are able to comprehend the complex feelings of both themselves and others. Leaders with emotional intelligence are able to steer clear of conflict, negotiate relationships with clients and coworkers, and inspire their teams. In terms of decision-making coaching and employee engagement, empathetic leaders do 40% better [203].

It's common knowledge that outstanding leaders need good, if not exceptional, communication skills. False belief: communication skills, not listening skills, are used to evaluate leaders. Supervisors should engage in "active listening" rather than completing workers' phrases or analyzing data. For millennia, renowned intellectuals have debated intelligence. While Einstein said, "The ultimate indicator of intelligence is not knowledge but imagination," Sternberg classified intelligence into three categories: practical, creative, and analytical [205, 206]. There is ongoing discussion over various definitions of intelligence. Even those who are "book brilliant" could not have "common sense." Emotional and social intelligence, which are critical for coaching and leadership, are not measured by IQ testing. Some problems may be resolved by listening to employees and customers, eliminating obstacles, and promoting achievement. Market signals must be followed by leaders. Early signals are usually long-standing, although sometimes quick pivots are required [228]. Customer relations are improved when these signs are recognized. A leader should always be there to provide customers with the information they need to prosper as the world evolves.

One characteristic of high-achieving teams around the world is trust. Future leaders will cultivate "psychological safety" in their teams, fostering an atmosphere where members feel comfortable enough to voice concerns, think freely, and communicate honestly. Team performance is improved by trust, which produces cheaper and quicker results. By showing that they trust their teams, these leaders promote more open communication, which increases output and efficiency [210, 211]. Tech executives need to be adept at telling stories using

powerful graphics and remote communication tools in today's hybrid remote work environment. Instead of giving boring presentations, they should customize their messages to fit the personas of their team members. They should also use square webcam cameras and modern tools to engage audiences remotely in order to foster a sense of trust and teamwork [204].

Creating a strong leadership culture around yourself is an important part of being a modern leader, in addition to carrying out plans and motivating results. By spotting and developing new leadership potential inside the company, modern leaders increase their impact beyond their own accomplishments. Future leaders who are successful enable others to realize their potential and goals. Future leaders ought to value assisting others in realizing their potential [229]. By demonstrating how their work fits into the company's goal and setting a positive example, a competent coach and leader encourage team members to be driven and committed to it.

A modern leader prioritizes meeting the needs of others, embodying the values of a servant leader. Caring for the welfare of workers and their communities is a key component of servant leadership. Servant leadership maintains its emphasis on the people, in contrast to conventional leadership, which often focuses on corporate or economic goals. Instead of seeing their employees as just tools or resources, leaders should view them as unique people. People use tools in today's companies; they are not the tools themselves [230]. This is the very first lesson in being a leader who prioritizes people.

The globe has become a more linked, borderless place as globalization continues to dominate society, particularly in commerce and communication. Building diverse, high-performing teams, navigating global marketplaces, and comprehending new cultures are challenges that modern leaders must tackle.

The globe is becoming a more linked, borderless place as globalization continues to rule society, particularly in the areas of communication and industry. Building diverse, high-performing teams, navigating worldwide marketplaces, and comprehending new cultures are challenges that modern leaders must tackle [225].

To maximize digital transformation, organizations need leaders to oversee asset transformation and align initiatives with strategic goals. These leaders guide digital efforts as the organization adapts to technology and customer demands. However, there is no one-size-fits-all leadership structure—single leaders may create silos, while distributed leadership can lead to misalignment and ongoing issues. To prevent digital initiatives from becoming resource drains, it's essential to maintain clear boundaries.

Technology leadership today demands more than technical skills and a title; it requires a balanced, adaptive skill set to navigate the rapidly evolving tech landscape. Executives must blend strategic vision with technical detail and promote cybersecurity knowledge across all levels. Effective leaders also need emotional intelligence to build strong teams, recognizing the unique emotional and professional needs of each member

[226]. Tailoring management approaches to individuals maximizes team performance.

Technology executives must embrace continual change and encourage their teams to stay flexible through courses and workshops. A tech leader's role involves not just technical skills, but also cyber security awareness and emotional intelligence. To effectively guide teams in a fast-changing landscape, leaders need to balance practical skills with strategic vision, promote ongoing learning, and uphold ethical standards.

Technology executives must be data-savvy. Without facts, a leader will guess, which is perilous given the stakes. Data gives technology executives actionable information, minimizing intuition [208].

For IT executives, keeping an eye on new trends is essential. What are the main changes in the industry? How can a leader match overarching company goals with their technology strategy? Predicting future trends is just as important to effective technology leadership as managing present demands. A leader may get a competitive advantage as a first mover by anticipating these shifts [230].

Tech jargon might be confusing to non-technical folks. Tech executives may clarify complex jargon for stakeholders. Executives in technology must connect IT with other domains. Separating company technology is not a good idea. For a cohesive strategy, modern leadership must combine IT with other domains. More strategic board reporters need to develop their ability to communicate with laypeople despite the intricacy of their work. A well-written ten-minute board presentation may help IT CEOs increase their long-term success and help their successors [209].

Great power has ethical obligations. Technology CEOs need to think about moral dilemmas. They have to deal morally with data privacy and AI ethics. Green technology is essential, not just a fad. It is economic and morally right to support sustainable tech leadership [228].

Innovation should be encouraged by technology leaders. For teams to share their innovative ideas, they must be confident. Innovation sometimes defies convention by being adaptable in IT leadership, which may ultimately be beneficial [229].

Compared to regular offices, remote and hybrid workplaces provide different dynamics and problems, therefore leadership abilities need to be modified appropriately. When managing teams, modern leaders should handle problems such as limited face-to-face supervision, dependence on digital technologies, and obstacles to communication. Effective virtual leadership has become more and more crucial as remote work and virtual teams expand. Effective remote team managers can guarantee constant performance, engagement, and cooperation across different locations and time zones. They need to investigate best practices including team building techniques, communication, and trust-building. Leaders must also figure out how to foster a sense of community within virtual teams and lessen the sense of isolation experienced by remote workers [230].

This may be accomplished via frequent check-ins and virtual team exercises that prioritize trust and honest communication.

Leadership abilities must change to reflect the distinct dynamics and difficulties that remote and hybrid workplaces bring in comparison to regular offices. When managing teams, contemporary leaders should handle difficulties such limited face-to-face supervision, dependence on digital technologies, and obstacles to communication. The need of successful virtual leadership has grown as remote work and virtual teams have expanded. Effective remote team managers can guarantee continuous engagement, performance, and teamwork across time zones and locales. Best practices including trust-building, communication, and team-building techniques should be investigated. In virtual teams, leaders must also figure out how to foster a sense of community and lessen the sense of isolation experienced by distant workers [230]. This may be accomplished with the support of online team activities that prioritize trust and open communication as well as frequent check-ins.

Compared to regular offices, remote and hybrid workplaces provide different dynamics and problems, therefore leadership abilities need to be modified appropriately. When managing teams, modern leaders should handle problems such limited face-to-face supervision, dependence on digital technologies, and obstacles to communication. Effective virtual leadership has become more and more crucial as remote work and virtual teams expand. Effective remote team managers can guarantee constant performance, engagement, and cooperation across different locations and time zones. They need to investigate best practices including team building techniques, communication, and trust-building. Leaders must also figure out how to foster a sense of community within virtual teams and lessen the sense of isolation experienced by remote workers [230]. This may be accomplished via frequent check-ins and virtual team exercises that prioritize trust and honest communication.

Leaders who set a positive example can inspire their colleagues to succeed and contribute to a healthy work environment. Modern leaders demonstrate that ambitious goals are attainable and encourage change by sharing their experiences. This approach fosters unity and collaboration within the workplace, creating an atmosphere where employees feel motivated to work harder and strive for higher levels of excellence.

8. Contemporary Leadership Practice in Modern Era

The modern era's technological revolution has a significant influence in how modern businesses' activities are altered by digital, smart, communication, and information technologies. Humans are experiencing enormous problems in this day and age, necessitating ongoing answers. These days, leaders who possess the necessary abilities and competences may overcome these challenges. Technology is changing access, distri-

bution, and content for leaders. Throughout history, new technology have increased human knowledge. Without coaches or mentors, leaders are improving their own knowledge and intelligence with the use of more digital technologies. Smart and digital technologies might save costs. These days, advanced technologies are essential since they enable overworked leaders to implement the next wave of assistive technology. Using technology alone to tackle organizational challenges seems foolish in this day and age of fast advancements in digital and smart technologies, as well as the requirement for more powerful equipment to handle software and application updates. Human resources that are skilled, qualified, and competent are crucial for the growth of science and technology. The technology in question may aid in the personal and professional development of contemporary leaders as well as the advancement of human resources, businesses, societies, and countries. There are advantages and hazards to advanced technology, particularly digital and intelligent technology, which should not be disregarded. Employee morale is lowered by workplace toxicity, which leaves workers feeling unappreciated and uninspired. This mindset might quickly spread across the organization, impeding cooperation and teamwork [229]. In the statutory setting, nurses experience emotional exhaustion and stillness due to harmful leadership behaviors. Organizations are severely impacted by them. Toxic leadership is thus a serious risk to any company and has to be avoided.

Effective leaders encourage innovation and growth, create a positive and welcoming work atmosphere, and inspire and encourage staff members to reach their objectives and realize their full potential. But not every leader has these attributes. Some people have toxic personalities that may lower spirits, stifle innovation, and create a stressful, irate, and bitter atmosphere. Millennials, who make up around one-third of the world's workforce today, are primarily motivated by a desire for career freedom and control while simultaneously pursuing chances for both professional and personal development. The younger Gen Z group, on the other hand, may place an even higher value on work-life balance and meaningful employment than on conventional career growth. However, while employing technology as a leadership tool, personal wellbeing is essential. Leaders need to prioritize their relationships, family, and health. Effectiveness and decision-making are impacted by the physical and emotional well-being of leaders. "Wherever you see a great business, someone once made a courageous choice," as Professor Peter Drucker once said. Today's leaders must make a number of courageous decisions [231]. Even if these are difficult times, good leadership could have a greater impact. Global business has only faced greater challenges during the two World Wars. Leading a firm through such instability requires courage, conviction, mental fortitude, concentration, and a strong sense of purpose. It is a current truth that leaders cannot progress on their own. In order to accomplish organizational objectives, charismatic, cooperative, and open-minded leaders may unite disparate points of view and guide teams with different goals and needs. Business

CEOs are no longer seen as commanders, chiefs, or figure-heads. Vision and charisma are still important but not enough. Leaders need to be able to go from commander-in-chief to mentor to high-performing teams or individuals in the dynamic business environment of today [59]. The capacity to successfully lead across generations, cultures, attitudes, and motivations is crucial. These days, effective leadership demands a variety of qualities.

8.1. Purpose

An inspiring cause is essential, but a cause is required. Leaders should connect the corporation's fundamental mission, or "what this organization stands for," with their own personal purpose, or "what I want this company to accomplish." Businesses and leadership groups need a mission that goes beyond profit and sales targets. Instead than just talking about it, leadership has to show commitment, vision, and purpose. Leaders who lack focus and don't practice what they preach are quickly ignored.

8.2. Networks

- 1) The power of networks both within and outside of their enterprises is often overlooked by executives. Gaining a better knowledge of important stakeholders inside the company is one of the many advantages of using these networks.
- 2) Identifying obstacles to innovation and collaboration.
- 3) Effectively communicate critical messages to key stakeholders.
- 4) Locating and employing the best individuals in the field.
- 5) Locating possible new technology, consultants, suppliers, or experts in the field who might help businesses perform better more quickly.
- 6) Creating, planning, and carrying out fruitful professional paths.

8.3. Long-term Lens

Modern leaders need to plan forward rather than get bogged down in specifics and put long-term strategy ahead of short-term tactics. A forward-thinking vision is necessary for strategic implementation. It is advantageous to identify and collaborate with internal stakeholders, investors, and shareholders who share similar long-term values. In order to assist investors in following value-growing companies, S&P Dow Jones Indices introduced the Long-Term Value Creation Global Index in 2016 [227]. Effective communication of internal goals, plans, and execution techniques is necessary to keep an external emphasis on the long term.

8.4. Adaptability and Agility

Modern leaders need to plan forward rather than get bogged down in minutiae and put long-term strategy ahead of short-

term tactics. It needs a forward-thinking vision to execute a strategy. It helps to identify and collaborate with shareholders, investors, and internal stakeholders who share similar long-term ideals. The Long-Term Value Creation Global Index was introduced by S&P Dow Jones Indices in 2016 to assist investors in following value-growing companies [227]. Effective communication of goals, plans, and execution techniques inside is necessary to keep a long-term focus on the outside.

8.5. Culture Orientation

Today's leaders need to plan forward rather than get bogged down in minutiae and put long-term strategy ahead of short-term tactics. A vision for the future is necessary for strategic implementation. Collaborating with shareholders, investors, and internal stakeholders who share similar long-term values is advantageous. In 2016, S&P Dow Jones Indices introduced the Long-Term Value Creation Global Index to assist investors in following companies that are increasing in value [227]. It is necessary to effectively communicate goals, plans, and execution techniques internally in order to have a long-term focus outside.

8.6. Homogeny and Equivalence

Every day, people lead, manage, communicate, work, and live in various ways. However, rather than seeing subordinates as receivers of commands, a modern leader must regard them as members of the organization. In this sense, a leader should create a community and a long-lasting trust inside the company. Leaders also need to understand that strategic communication helps their people do the right thing, not just the right thing. To facilitate organizational development, this calls for strict internal and external relationship management [61]. Members of an organization desire a leader who can motivate them and help them achieve. A leader communicates well and sets a good example. As a result, leaders need to "walk the words." Team members and leaders now work together more [62]. As a result, both the leader's responsibility and connections with subordinates are essential to leadership. To exchange information, plan and finish activities, assist with decision-making, and address problems, coworkers and employees must communicate. Conflict, cooperation, decision-making, power and authority, obedience, resistance, morale, cohesion, and organizational cultural ties are all supported by organizational communication [5]. They collaborate to produce, market, or assist the general public, which includes clients, consumers, or comparable entities [6].

8.7. Effective Communication

Communication, according to Beebe and Masterson, is acting on information [7]. By transmitting and receiving signals simultaneously, it also enables people to share their knowledge of the world. The most efficient method of clarifying meaning and resolving misconceptions is often face-to-

face contact [8]. According to research, group members' communication styles have a big impact on how well they collaborate. Managing contacts between employers and workers for motivation, coordinating organizational requirements and objectives, and assisting with decision-making are all examples of communication jobs in the workplace. Being a gatekeeper, liaison, bridge, isolator, cosmopolite, and opinion leader are other common communication jobs. Today's leaders need to be proficient communicators. Leaders need to be good communicators because they direct organizations. Effective communication facilitates smooth operations, from minor stakeholder concerns to enterprise-level decisions that cost millions of dollars [231]. Good service, delivery, and expansion at all organizational levels depend on effective communication. To create solid, knowledgeable, and significant professional relationships, leaders control the flow of information via a variety of communication channels. The following is a summary of leadership in the contemporary age.

- 1) to create a nurturing atmosphere where people may grow, mature, and live in harmony with one another.
- 2) to encourage future sustainability and environmental harmony.
- 3) To create communities of shared responsibility and mutual care where everyone is valued and their welfare and dignity are upheld.

8.8. Clear Direction

In contemporary businesses, successful leadership requires clear communication and guidance. Modern leaders need to know how to make good use of cutting-edge technology. They must also guide their teams toward shared objectives and establish the correct course. Since consistent and effective leadership affects employee engagement and performance, it is crucial that future leaders respect their subordinates as members of the team. In order to do this, leaders should use useful strategies that assist in providing subordinates with clear guidance [9].

- 1) When feasible, try to focus on just one goal and make sure it complements all the others.
- 2) Limit the conversation to two or three primary topics.
- 3) Concentrate on emphasizing the key ideas.
- 4) Translate the strategy into terms that are used in operations.
- 5) Do it again.
- 6) Explain the reasoning behind any choices or actions.
- 7) Ask inquiries, then wait patiently for answers.
- 8) Give a succinct synopsis and an understandable explanation.

9. Leadership Concept, Practice and Way Forward

The modern era is defined by the crucial role that leadership plays in providing a team of people with vision, dedication,

guidance, and inspiration to complete a job or goal that would be challenging for a single person. Other members of the team, group, or organization are referred to as followers. Those who share the leader's goals and vision are considered followers. The study of followership is also becoming more and more popular. But it's important to avoid becoming confused by the term "followers" or followership. It is never appropriate to use this phrase in a derogatory or negative way. Followers may also demonstrate leadership traits in order to fulfill their own responsibilities and duties. Many of today's most successful leaders began as outstanding followers in order to get the knowledge, experience, and opportunity needed to guide others. This is because being a follower is an essential role [227]. Put another way, cultivating and valuing followership skills often aids in gaining the experience and knowledge required to become a leader.

9.1. Vision

The organization's promise for the future is shown by its articulation of its goal, which is so compelling and organic. Within the company, vision fosters a feeling of belonging, self-worth, and shared purpose. The organization's vision was previously set by top management. Contemporary leaders are realizing more and more how important it is to interact with people who have a more intimate knowledge of the client and the workplace [229].

9.2. Mission or Mission Statement

This document usually delineates the organization's goals and the activities that will be undertaken for stakeholders and customers. It is also crucial to define the organization's distinctive value or services that are a consequence of its efforts. In general, mission statements are made of a minimum of three components. The company's overall objective or mission is originally determined. Secondly, a declaration that delineates the concepts that workers are obligated to respect and commit to the decision-making process. Third, a declaration of the primary goals that management thinks essential completion of the mission. These aims should be congruent with the philosophical concepts that workers are required to respect. Today contemporary leaders guarantee that resilience and human-centric growth of organization can sustain and continue. They act as 'cement' in an organization to build trust through reality, accountability and transparency.

9.3. Values

These are the guiding concepts that dictate how employees, starting with management, wish to run their business and behave. These guiding concepts form the basis of an organization's culture and will dictate how it evolves. Today's leaders remain committed to the principles of moral bravery and integrity.

9.4. Commitment

This is the emotional commitment of a worker to carrying out a choice, conclusion, or goal, which involves putting in a significant amount of effort. In order to accomplish the goal and set goals, contemporary and successful leaders must be committed and seek out the commitment of others [227]. These days, leaders are unwavering in their dedication and ability to build strong bonds.

9.5. Motivation

This is the capacity to provide an explanation or reward that inspires others to act or make a commitment. Because they recognize that every person is unique, successful leaders react to a wide range of motivators. The creation of a fear-based environment is the least successful long-term motivator, and money is not the most effective. A perceptive leader also recognizes this. Modern leaders are able to effectively inspire their followers [228].

9.6. Consensus Building

This is a leader's capacity to bring disparate group members together. When members of a group agree that a certain option is acceptable, even if it may not have been their first choice, this is known as a consensus. Compared to a decision reached by a mere majority, the formation of consensus may inspire a higher level of dedication from group members. On the other hand, reaching an agreement requires more time and may not always be feasible [230]. In order to start implementation, modern leaders often need to take the initiative and confirm that the collective decision has been taken.

10. Conclusion

"The strongest leaders motivate others by uniting individuals behind a common goal," according to Ken Blanchard. In contrast, Warren Bennis said, "The most damaging leadership myth is that leaders are born—that there is a genetic basis to leadership." That is absurd; in fact, the reverse is true. Leaders are not born; they are created. We live in a time of intelligent technology. By 2030, AI is expected to need the transformation of about 75 million to 375 million jobs globally, according to MGI predictions. In addition, the MGI research emphasizes the establishment of new roles and duties. The American Economic Association's researchers agree with the MGI's predictions, stating that only a few jobs can be fully mechanized, even if certain activities can be automated. They also expect that staff members will get training to take on their new roles, which will include a significant shift in management and leadership style. A competent leader has the ability to motivate and inspire people. Power, wealth, education, status, or reputation are not necessary for modern leadership. Instead, lead-

ers are guided by charm, influence, and persuasion. Leadership encompasses behavior, attitude, style, perspective, and personality. It is a mindset rather than a role or title. Instead than using authority and control, modern leadership uses passion to inspire, encourage, and influence others. Managers now connect people, build connections, and interact with others. Employees must be empowered by recognizing and using their special skills and assets. In today's diverse, complicated businesses, leaders must build relationships, provide assistance, and find solutions to problems. To guide and orient their soldiers, they need to listen like coaches. Stability and security are sought inside when external circumstances are difficult. For employee guidance, future management must establish a global social structure. Modern leaders should assign and prioritize important tasks that only they can do in order to optimize organizational value. This approach enhances leadership brand definition and self-awareness. How well they carry out their main responsibilities and resolve leadership issues determines how effective a leader is. Building trust, encouraging teamwork, and handling challenging circumstances all depend on modern leaders being able to comprehend and control their own and others' emotions. They must inspire people to make a significant contribution by clearly expressing their goal and coordinating their efforts with the larger good. In order to improve communication, teamwork, and decision-making, they must also comprehend and make use of technology.

"The strongest leaders mobilize others by uniting them behind a common goal," said Ken Blanchard. In contrast, Warren Bennis said, "The most pernicious leadership myth is that there is a genetic aspect to leadership—that leaders are born." That is absurd; in fact, the reverse is true. Leaders are created, not born. We live in a time of smart technology. MGI estimates that by 2030, AI will need the transformation of around 75 million to 375 million jobs globally. The MGI research also emphasizes the establishment of new roles and duties. Researchers from the American Economic Association agree with the MGI's predictions, stating that only a few jobs can be fully mechanized, even if certain activities may be automated. They also want staff members to get training in order to take on their new roles, which will fundamentally alter management and leadership styles. A competent leader can inspire and motivate others. Power, wealth, education, status, or reputation are not prerequisites for modern leadership. Rather, leaders are guided by charm, influence, and persuasion. Being a leader requires behavior, attitude, style, perspective, and personality. It is not a job or title. Instead than using force and control, modern leadership uses passion to inspire, encourage, and influence. Contemporary managers connect people, build connections, and interact with others. They must recognize and use each employee's special skills and assets in order to empower them. In today's diverse and complicated businesses, leaders need to build relationships, provide assistance, and overcome obstacles. For their soldiers to be led and oriented, they must listen like coaches. Stability and security are sought

inside when external circumstances are difficult. Future managers must establish a global social structure to guide employees. Modern leaders should assign important tasks that only they can do in order to enhance organizational value. This approach improves leadership brand definition and self-awareness. The effectiveness of a leader is determined by how well they carry out their main responsibilities and resolve leadership issues. In order to establish trust, promote teamwork, and handle challenging circumstances, modern leaders must be able to recognize and control their own emotions as well as those of others. In order to motivate people to make a significant contribution, they must clearly state their mission and coordinate their activities with the larger good. In order to improve communication, teamwork, and decision-making, they must also comprehend and use technology.

Since everyone is actively engaged in service, anybody may become a leader in the current period. James M. Strock asserts that if the main goal of leadership is to assist others, then everyone should be able to switch between the roles of leader and follower. The most important resource for every firm is its people. According to Mark Zuckerberg, one of the most important developments that has improved openness and transparency is the growing focus on developing deeper social interactions, greater relationships, and trustworthiness. We are transitioning from a transaction-focused world to a relationship-focused one. Leadership is a partnership between willing and capable adults. The connection is dynamic. These days, it's often thought of as the solution to every issue. These days, managers are expected to exhibit traits like "visionary," "charismatic," "transformational," and "genuine." These characteristics are thought to be necessary for "followers" to function well, perhaps. In this day and age, communication is a critical component of leadership. Dwight Eisenhower has often been undervalued, perhaps due to his advanced age while in office, his somewhat erratic communication abilities, and his incapacity to effectively express a forward-looking position on civil rights problems. There isn't a single leadership approach that works for everyone. Every behavior is a reflection of one's priorities, according to Mahatma Gandhi. The brain is an amazing organ that starts working the moment we wake up and keeps going till we go to work. The responsibilities of leadership are becoming more intertwined. The famous quote from Theodore Roosevelt reads, "Words are instruments to me." I try to show my audience that I am sincere, that my words have significance, and that I uphold the core values of civilization. The highest level of leadership connection is love. "Anyone can be great because everyone can serve," said Martin Luther King Jr. Neither a college degree nor flawless grammar are prerequisites for employment. All that is required is a spirit motivated by love and a heart full of grace.

The essential qualities for success in the modern day are integrity, bravery, inventiveness, flexibility, and adaptability. Strong convictions are necessary for effective leadership in the tech-driven age. Leaders must be tech-savvy and knowl-

edgeable, but they also need to be honest, flexible, and balanced. Open communication fosters cooperation and trust. Leaders must be truthful with their teams, stakeholders, and themselves in order to foster innovation and feedback. Future leaders need to be prepared to take advantage of new possibilities, embrace creative thinking, and successfully handle difficulties in a sector that is changing quickly. A harmonic balance between the technical and human elements is attained by effective leaders. Persuading, influencing, inspiring, and motivating people are all part of modern leadership. It is quite different from conventional leadership, which is based on ranks, titles, or positions. Command is constrictive and may lead to disagreements or objections from those who are not moved, inspired, or impacted by the goals, vision, concepts, and viewpoints. Because followers or team members can relate to and be persuaded, a modern leader who successfully motivates people by clearly outlining the benefits and downsides of actions, tactics, and plans in a practical, on-the-ground way is more likely to be accepted and followed. In contrast to command, control, influence, and order, contemporary leadership relies on engagement, communication, care, and attention. Therefore, modern leadership is a holistic strategy, lifestyle, attitude, and behavior rather than being centered on rank, position, or title. In addition to work performance or production, modern leaders place equal importance on employees' professional attitudes and personal development. Leaders need to have a compassionate and attentive relationship with their employees. As a result, contemporary leadership is a comprehensive way of living in which people hone their behavioral abilities to encourage and inspire their team members to follow in their footsteps. Command, control, power, and ranks/titles provide potential for leadership, but they are far from the characteristics of a contemporary, successful leader.

One of the greatest businessmen, investors, and thinkers of all time is Warren Buffett. "You can't make a good deal with a horrible guy," he remarked. Leaders should always prioritize quality above cost, but they should also be not afraid to make mistakes. You will avoid the majority of your issues if you have the guts to follow your instincts. "Love everyone, trust a few, do harm to none," went William Shakespeare. As Winston Churchill famously said, "It is of little concern to be pleasant when one must assassinate a person." To address issues, contemporary leaders need to think creatively. Key traits of contemporary leaders are boldness, discernment, inventiveness, humility, flexibility, agility, and adaptability. Once again, in order to promote innovation and change, modern or contemporary leaders should engage directly with their staff. These days, effective leadership means moving from output-focused to people-centered management, implementing creative strategies for modern circumstances, and aggressively implementing new processes while inspiring teams to welcome change. This contemporary approach places a strong emphasis on a variety of skills, such as encouraging creativity, teamwork, a sense of purpose, and resilient teams; optimizing the

potential of every team member; utilizing data to enhance performance and growth; sustaining productivity in remote environments; and dedicating contemporary leaders to adaptability. Employee listening tools are essential because contemporary leaders must be able to communicate effectively and actively listen in order to comprehend the feelings, problems, and ideas of their teams. Making strategic, business-oriented decisions presents special difficulties for leadership in the public sector, nonprofit organizations, and educational institutions. These crucial choices might have disastrous results if poorly thought out or carried out. These days, effective leadership improves wellbeing in addition to performance. Everyone benefits from it. "We don't have to be smarter than the others," Warren Buffett advises aspiring leaders. We must have more self-control than the others. A modern leader puts their own health first. Nearly 40% of leaders are suffering from burnout. It's more - harder to see what's happening around you and how you can affect the best possible results in your life and career while you're in this condition. For leaders to be able to sustain the energy necessary for their positions, self-care and wellbeing are crucial.

Abbreviations

4IR	Fourth Industrial Revolution
5G	Fifth Generation
AI	Artificial Intelligence
AIST	National Institute of Advanced Industrial Science and Technology
BC	Before Christ
BMW	Bayerische Motoren Werke
CEO	Chief Executive Officer
COVID-19	Coronavirus Disease 2019
CPS	Cyber-Physical Systems
DL	Deep Learning
ICT	Information and Communication Technologies
IoT	Internet of Things
IQ	Intelligence Quotient
IT	Information Technology
M2M	Machine-to-Machine
MGI	McKinsey Global Institute
MIT	Massachusetts Institute of Technology
ML	Machine Learning
PwC	PricewaterhouseCoopers
ROI	Return on Investment
S&P	Standard & Poor's
SI	Super-intelligent
SMART	Specific, Measurable, Achievable, Relevant, and Time-bound
STEM	Science, Technology, Engineering, and Mathematics
TRINA	Tele-Robotic Intelligent Nursing Assistant
US	United States
WBE	Whole Brain Emulation

Conflicts of Interest

The authors declare no conflicts of interest.

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