EMERGING MILITARY TECHNOLOGIES, ARTIFICIAL INTELLIGENCE AND STRATEGIC STABILITY IN SOUTH ASIA (2010–2025): CHALLENGES AND OPPORTUNITIES FOR PAKISTAN IN THE POST-NUCLEAR DETERRENCE ERA

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Abstract

The incorporation of the new age technologies changes the strategic and security scenario of already unstable region of South Asia in particular as far as India and Pakistan are concerned. The area already has its disagreements, competition, and experiences of conflicts and battles. Nuclearzation of South Asia bring about strategic stability that is threatened by the arrival of the new technologies, including AI, LAWS, Air defense systems UAVs hypersonic missiles, space technologies, Quantum technologies, cyber-technologies, etc. This paper explores the implication of these technologies on South Asian security and strategic climate by the structural realism and classic realism approaches or perspectives. Thematic, qualitative mode of investigation is used to complete investment by applying the required and relevant data that are the main aspect of this study secondary and analysis. Emerging technologies threatened the national security of Pakistan strategically and reduce the nuclear deterrence, and also offer opportunities to Pakistan. The investment in technologies that would strengthen the economic and military positions of Pakistan can transform the challenges into the opportunities.

Key Words: Artificial intelligence, technological advancement, security dilemma, Cyber-attacks, Nuclear deterrence, Autonomous weapons.

1.1 Background of study

Nuclearzation of South Asia create a strategic stability in the volatile region, South Asia. There is always an element of strategic instability in the backdrop of this India Pakistan

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Competition and lack of conventional balance of power, or enormous power gap there are many real grounds in this instability of India and Pakistan. The competition is there because of the historical baggage, territorial claims, ideological disparity and Indian ambitions of being the hegemonies in the region. India is the largest population of the world and one of the largest countries in the world in terms of resources, military and geographical area. There is nothing competing when we are not able to compare it with Pakistan or any other South Asian nation. This massive gap is among the cause to the strategic instability to prevent nuclearzation in South Asia particularly in the scenario of India and Pakistan.

The implementation of AI in South Asia will be accompanied by serious consequences because it will not only create an arms race but also destabilize the strategic situation in the region (Arif, 2019a). To guarantee its survival Pakistan attempts to heavily invest in military technologies particularly nuclear in order to produce strategic stability (Ryan, 2015). The adoption of new technologies such as AI in the military or militarization of AI and other new technologies once again casts a question of the existing strategic stability in South Asia and generates strategic arms race (Nadeem & Hamid, 2025).

India is diligently working at a high rate to modernize its military and embrace modern technologies in fighting with its enemies in accordance to the development of its offensive military principles. It is a time when we should also concern ourselves with AI and big data analysis, but not limit it to the definitions (Abbasi and Uzzaman, 2022). Indian heavy investment in modernizing its military capabilities to guarantee the balance in its favor in South Asia and remain ahead in race with China.

This paper is narrowed to define and examine certain threats to Pakistan and towards the prevailing strategic stability. Indian availability of emerging technologies to its defense is also challenging the Pakistani sovereignty. The presence of historical rivalry between the two states and four wars have the effect of creating a threat and war atmosphere. The current strategic stability is also influenced by external factor since it enables both countries to incorporate and adopting most advanced, sophisticated and new technologies into their military. AI, UAV cyber technologies, anti-satellite weaponry, anti-satellite systems hyper sonic missile systems (Ahmad, 2025). There are emerging risks and challenges to strategic stability in an ever more contested global common, that is, air, sea, cyber and space that are presented by disruptive technologies. The new technologies may nullify nuclear second-strikes, which forms the foundation of deterrence and strategic stability. In the same vein, unmanned underwater vehicles (UUVs) swarming would be able to find and/or neutralize nuclear submarines that are an essential element of US nuclear deterrence (R. Manning, 2020).

1.2 Statement of Problem

The South Asian region is in a transitionary period, which is characterized by the fast development and adoption of innovative technologies, such as AI introducing both threats and opportunities that transform the strategic environment of South Asia region in particular India and Pakistan. It is important that Pakistan should understand the finer implication of these technologies in order to make informed decision-making and policy formulation. The most important issue is how to manage the complex interplay in the strategic issues and opportunities that emerge due to the development and integration of

the Emerging technologies particularly AI in the Indian military industry that pose strategic problems as is the case with Pakistan.

1.3 Significance and Methodology of study

This research study has tremendous significances of the research, however there are two significance that hold paramount relevance namely its relevance to the national security policy of the state of Pakistan and the academic significance. This research study methodically examine the strategic implication of the new technologies particularly AI and their application to defense and military industry. Against this background of India and Pakistan and their competition this paper explores the consequences integration of new technologies particularly AI to the existing strategic stability of South Asia. Using the available theories in the structural realism of international relation, security dilemma and explore the strategic implication of the new technologies in South Asia particularly in the context of India and Pakistan. It is through these theories that the research considers the effects of the emerging technologies on South Asian strategic environment particularly on the situation in India and Pakistan. Another significant theoretical input is the redefinition of the doctrine of credible minimum deterrence, following the Indian incorporation of AI and hyper sonic and other new technologies into their military and development in the area splinter the Pakistan minimalist deterrence pose. This research is interdisciplinary; it examines the connection of technologies such as AI into defense and its strategic impacts on a particular region and specifically two countries that are already nuclear armed, it examines the point of intersection between IR securities and integration of technologies.

1.3.1 Qualitative research

The research study has been based on qualitative research design and there are various reasons as to why qualitative research design has been adopted.

1.3.2 Problem of the research and its character

The purpose of the study will be to explain and discuss the thorny case of strategic implications of new technologies and its impacts on strategic stability of South Asia. There are effects of emerging technologies that influence nuclear deterrence that has a direct impact on the national security of Pakistan.

1.3.3 Descriptive study

This paper aims at answering how and why research questions. It outlines the advanced association of India and Pakistan in the intricate security condition, and then the character of is study descriptive rather than statistical and correlational.

1.3.4 Data collection

In this research collection of primary date was not impossible, but complicated by the following factors due to the sensitivity of the issues of national security, nuclear data and other calcified military data it was very challenging to get primary data thus this research makes use of secondary data which are available in trusted source. And fallowing are types of sources.

Consult research journals/books of academic literature or publications. The top reputed local and foreign field research journals are used to retrieve relevant data. Gained information are scholars in the concerned area such as strategic studies, international relation theory, regional security etc.

1.3.5 Research Reports

Research reports provide data to gain depth interpretation and locate the responses of research problem and achieve the objectives of this research. The reports of renowned think tanks such as center for strategic studies Islamabad, and other think tank are utilized as secondary data.

1.3.6 International organizations report.

The economic challenges and opportunities are understood and put into perspective by using analytical and reports of international organizations such as IMF and World Bank.

1.3.7 Analysis of data

Analysis Data is analyzed using content analysis technique because the rationale is that we were analyzing various articles, books and reports based on available literature.

1.3.8 Theoretical analysis

To explain the reasons why the themes are set and further elaborate on the explanation of the themes, theories such as structural realism, security dilemma and classical realism are applied to explain the themes, why they are taking place.

1.4 Limitations

This research concentrates on narrow matters such as strategic stability, new technologies, challenges and opportunities of Pakistan. We look at strategic stability in South Asia when it is in the context of Indian Pakistan and not the eight countries that make up South Asians as a whole. This paper used secondary data because of classified records and its inaccessibility to strategic technologies information such as nuclear weapons related information in both India and Pakistan This paper specifically targeted American provision and provision it to alliance which poses strategic and national security risk to Pakistan and equally provide highly sophisticated technologies to Pakistan and China. As researchers, do not have easy access to restriction of sensitive and classified data as well as information in relation to national security, this is the reason why we rely on secondary and readily available and academic data mostly.

1.5 Scope of study

This paper limited itself to strategic implications of new technologies particularly AI in South Asia and specifically India and Pakistan and the role of avert and covert alliance of China and United States with the two counties as well as technological support and their assistance, it examines important emerging technologies in South Asia specific in India and Pakistan. It is not all and random emerging technologies but important emerging technologies that are applied to military and defense sector. The most important technologies to be discussed are AI, cyber tech, Air defense systems, nuclear submarines,

unmanned Arial vehicles (UAVs) anti-satellite weaponry high stealth fighter jets, hyper sonic missile systems and, communication and surveillance technologies. This paper will examine the strategic issues and opportunities available to Pakistan such as technological innovation, collaborating in modernization with China in such technologies in order to get strategic advantages and guarantee national security.

1.6 Main objective

With disruptive technology, in its surrounding, to determine the obstacles to strategic stability in South Asia and possible opportunities to Pakistan, the objectives of this research are as follows:

1. To examine the major disruptive technologies in South Asia.
2. To evaluate what threats to the national security of Pakistan and strategic stability.
3. To explain Opportunities of Strategic Advantages and Sustainable Development.

1.7 Research Questions

1. What are the major disruptive technologies in South Asian region, and what role are they playing in developing the strategic environment?
2. What are the special challenges of the disruptive technologies to the national security and strategic stability of Pakistan in the framework of its tussle with India?
3. How can the installation and acceptance of disruptive technologies in Pakistan help bring strategic stability to South Asia?

2.1 Literature Review

Disruptive technologies such as AI soon in South Asian region in dialogue of India and Pakistan and their historical antagonism redefining the character of conventional warfare and national power(Johnson,2022). This is a literature review that analyses the literature and evaluation of how emerging technologies has challenges and opportunities and the most crucial technologies in strategic stability of South Asian region. The artificial intelligence (AI) technology is a major trend that is transforming the modern military philosophy and the long-term strategic interests of countries. The South Asian Theater has seen considerable improvements in the field of AI, particularly with India becoming a significant investor in the latest technologies with a strong focus on AI in particular to support its strategic position. India is the fifth biggest economy in the world, and it has an important economic edge, which will allow the country to speed up the process of integrating AI into its military structure (Khurshid, 2023). Nuclear deterrence is the only and final security umbrella or grantee of Pakistan since the conventional power between the two nations is enormous. Anti-submarine weapons such as the high hyper sonic missile are integrated with AI supported technology, such as the UAVs, enabling anti-submarine weapons to have second strike capability of Pakistan. This emerging scenario

weakens the idea of credible minimum deterrence that is fundamental pillar of the nuclear policy of Pakistan to deter the threat of India. (Tehsin, Qumber & Ali, 2019).

The Artificial Intelligence (AI) and other new technologies have altered the direction of war. The South Asian security felt a change of paradigms in the military affairs when AI was introduced into their weapons and technology (Khalid1 & Ms. Saleha Masood, 2024). The existence of terrible security implications of a cyber-attack cannot be ignored due to the nuclear security being reliant on cyber security. This is because with time, cyberspace has become more entrenched in the nuclear systems (Imran, 2025).; cyberspace has proved to be a major menace to nuclear infrastructure in South Asia. Cyber threat has been used to show the vulnerability of nuclear systems in different instances. An outstanding case in point is that of Stuxnet, one of the most advanced cyber weapons to date, which is considered a game changer in the field of cyber security (Javed, 2024). Although Stuxnet is primarily linked with Iran, the weapon is a wake-up call to all the countries with nuclear arms (Ashraf & Kayani, 2023). The stability of the strategies is at stake because the aggressive pursuit of power by India induces instability with the assistance of the emerging technologies. Strategy stability has been determined as part of deterrence which is founded in mutual assured destruction and has been gauged to a large extent in the capability of vulnerability of components of strategic force (C. Dale Walton, (2013).

The nuclear goal and state policy of Pakistan is a plausible minimum deterrence in an effort to achieve strategic stability. (Mazzari, 2004) Fierce destruction or mutual assured destruction is basically feared of nuclear deterrence. The nuclear weapons seem to have had three broad effects on inter-state relations.

Firstly, the nuclear weapons offer the nuclear state an infrangible pledge of its autonomy and bodily wholeness.

Second, the mutual deterrence between hostile nuclear powers puts restrictions on violence and on that note, functions as a check on complete war.

Thirdly, nuclear weapons have enabled weaker states to counter attacks by the big powerful nations effectively by balancing the offence defense in their favour.

The nuclear use doctrine is a very important aspect of nuclear deterrence, as it addresses what a nation must say in the event that it intends to use nuclear weapons, when, and why. This option has been justified by proponents of defensive or no first use on a number of counts. The basic idea behind Indian nuclear armaments is to deter the utilization and risk of utilization of nuclear armaments by any state or power against India and its troops (Hussain, 2020).

In 2018 India committed 120 million $ to militarization of AI and it is yearly budget in five years plan and it is total 600 million (Sehgal, 2024). It is the most powerful maximization to safeguard the sovereignty and the survival of the state in the international system and it is the fundamental postulate of the classical realism theory.

2.2 Theoretical Framework

To carry out this research both classic and structural realism theories will be considered as primary lenses to an exhaustive study since the two theories of International relation and security are both inputs that have a wholesome analysis of the subject matter: Strategic implications of emerging technologies in South Asia challenges and opportunities to Pakistan.(Waltz,1979) Classic realism describe the politics of power in terms of human selfishness and egoism balance of national interests and anarchic nature of international system. The realistic diplomacy as defined by Hans Morgenthau (1940-80), is founded on the study of the balance of power and the necessity to advance the national interests (HEYWOOD, 2011). This classical realist theoretic leads to the world being devoid of a central authority and being full of anarchy and that without an authority every state attempts to maximize its power or form an alliance or balance its power with its competitors in the anarchic international system to ensure survival in this environment.(Waltz, 1979) Under the framework of the realist paradigm and with the South Asian scenario in particular Indian Pakistan setting India is fast modernizing its military with the emerging technologies are decisively challenging to change the exiting nuclear deterrence and sense of balance of terror and gain strategic dominance in South Asia. This theoretical frame work is capable of foretelling an impending technologies integration and growth between India and Pakistan. (Secher, Narang, Tamaldge 2019).

2.3 Conceptual framework

The purpose of this study is to research on the strategic implication of Emerging technologies in South Asia in terms of Pakistan Indian rivalry. To analyse variables I design variables are further subdivided into dependent and independent variables. The high rate of India integrating emerging technologies into their military and AI in particular which has the potential to influence the strategic situation of the South Asian region are the independent variables though indirectly they are dependent variables too but not because of the independent variable (Emerging technologies or ETs). Similar to as Air defense systems which India sells Russia S-400 Ballistic Missiles, AI, Cyber capabilities, Unman Aerial Vehicles stealth fighter jets, hypersonic missiles systems, nuclear submarines, second and third strike nuclear capabilities e.g. (Sultan, Khursheed, 2021) And as a consequence of these independent variable some in some dependent variable also exist as I have previously stated which are result possible outcomes or results of independent variables.

The strategic Implications on Pakistan that we can subdivide into sub-categories such as economic, military or national security, Political and, diplomatic e.g.(Mazari, 2004) National security or militarily we can research threat level brought about by Indian ETs integration and development and come up with the best responses(Khan, 2022). Economically it impacts in terms of economy since it needs to respond but the state and size of economy of Pakistan is not at such a position to respond equally to India. The output of above mentioned dependent variables will influence the foreign policy and diplomacy of Pakistan to be in opposition to Indian ETs and empowerment to the military and economic status of Pakistan which has been closer to China and other global technological military and economic giants as turkey and Russia. (Small, 2015). The foreign policy of Pakistan will be affected. In this case Pakistan will have challenges, as well as opportunities. Independent variables Applied theories Catalysts or mediators

Dependent variables (Out comes or results in the case of South Asian region in the case of Pakistan specifically).

2.4 Challenges

Economic issues and capabilities react to Indian ETs investment due to the existence of a vast economic divide between nations, instability issues and access to world market of new technologies. 2.5 Opportunities even though all the challenges have opportunity in itself it is natural fact. Pakistan can also build a strategic alliance with other anti Indian nations such as china, to counter attack it, which can boost its asymmetric strategies. (Small, 2015). A relationship is exist in between the strategies of adaptation by ETs of India and the strategic challenges of Pakistan which I can describe blow.

a. Indian high-speed integration ETs impose economic burden on Pakistan and Pakistan defence budget.
b. The influence of Pakistan by those countries will bring its needful ETs to be stronger.
c. Indian adoption has been direct challenge in status quo security in region particularly strategic equilibrium between both India and Pakistan.
d. It put a strain on nearly every field Economic to military, foreign policy to diplomacy. (Mazari, 2004, Khan, 2022).

3.1 Unified New Technology in the military. and AI-enabled Warfare Structures.

Technologies in the current strategic environment of South Asia (2010-2025) have a wide range of sophisticated engineering and scientific systems that transform the nature of warfare and basics of deterrence and stability (Secher,Narang& Talmadge,2019). Technologies in this research are conceptualized as deliberate, state-driven uses of innovations in military and dual use areas that modify tactics of calculation, decrease decision-making processes and empower forces in unconventional formations. (Johnson , 2020) Particularly, technologies in this system are:

a. Emerging Military Technologies

These are hardware, software and networked platforms which either expand or substitute traditional combat systems, and allow new forms of engagement, sensing, and lethality (Sultan, Khursheed, 2021). They include:

i. Semi-autonomous and autonomous weapon system systems can be operated with a minimal amount of human intervention.

ii. Unmanned vehicles (e.g. aerial, maritime, and ground drones) carrying out intelligence, surveillance, reconnaissance and strike operations.

iii. Hypersonic weapons and high maneuverability missile systems that allow a combination of high speed and maneuverability to shorten the reaction time of enemies.

iv. Complex networked battlefield command and control systems, combining battlefield information domains. (Alberts, Hayes, 2003)

These technologies form the core of changing doctrines including network-centric and hybrid warfare and have direct contribution to the lethality of the milities and the range of their operation.

b. Machine Learning Systems and Artificial Intelligence.

Artificial Intelligence (AI) is a series of computational models and programs that make machines do the tasks that should have been done by human intelligence. In the situation of the military, (Rusell, Norvig, 2021) AI includes:

i. Synthesizing multi-domain sensor data to create better situational awareness, Data fusion and real-time analytics. (Cummin, 2017)
ii. Decision support and targeting via AI automation and minimizing the time interval between perception and response.
iii. Weapons and ISR autonomous decision loops.
iv. Automation in cyber-Defense and cyber-Offense such as the recognition of patterns used to identify threats and the implementation of cyber-attacks in response to the threats.

These AI applications are changing how decisions in the military are made making them faster, more complex, and less transparent, forming potential competitive advantages and potential misjudgments or unintended escalation.

c. Cyber and Information Technology Areas.

Though the two terms are usually used in isolation, in this case, cyber technologies are the systems that support or disrupt the digital infrastructure, channels of communication, and data integrity. This includes:

i. Cyber-attack and defense tools which impact command-and-control and critical infrastructure.
ii. Those information operations platforms which use AI to create and promote narratives, such as deep fakes and automated disinformation, among others.
iii. Tactical communications that are secure and a robust network architecture that is distributed operations-friendly.
iv. In hybrid war environments, cyber technologies either act as force multipliers or disruptors by making competition in peacetime and kinetic escalation indistinguishable.

d. Assistive and Supportive Technologies.

These include enabling mechanisms that have a direct effect on the efficiency of the mainstream military technologies, including:
i. Sensors and quantum computing that could be beneficial in encryption, early warning and signal processing.
ii. Space capabilities (e.g. position/navigation/timing systems and reconnaissance satellites).

iii. High-tech equipment and production of quicker, lighter, and more robust military equipment.

These technologies complement the existing lines of operations, demonstrate new strategic dimensions and create asymmetries between those states which embrace them and those who do not.

4.1 Major new technologies in the changing strategic horizon of South Asia.

The South Asian strategic environment is radically changing as the emerging technologies are becoming the defining factor of the security environment of the region. The most prominent ones include the improvements in artificial intelligence (AI), (Abid, 2023) which are improving the ability to make autonomous decisions, perform intelligence analysis, and target precision. With the unparalleled innovation in new technologies artificial intelligence, cyber, and autonomous and advanced conventional weaponry, the nature of war is bound to change significantly and lea.ve a new security land scape in the South Asian region (Babar & Abbasi, 2023, Khurshid, Zaman2024)

4.2 AI and automation

Artificial intelligence is a subfield of computer sciences and it is a developing subfield in computer science. The two key contributors of a new era of technological development are automation and artificial intelligence (AI). AI is the intelligence that will be used to positivate automation which is the equipment of effectiveness that executes the routine, rule-driven tasks without human involvement. This is the intelligence that enables computers to learn based on the data, adapt to the evolving conditions and make complex judgments. Artificial intelligence is taking the place of human in various aspects of life including social sector and national security. (Babar, Sarwar, 2025) AI and machine learning ML are permeating all spheres of life practically in every corner of the world. Artificial Intelligence (AI) refers to the science With the increasing complexity of the technologies, the pressure of the Artificial Intelligence continues to rise due to the capacity to address complex issues with the minimal human resources and expertise and within a restricted time period. The technology of AI takes up the capabilities to make the technical expertise equipped and can enhance expertise to learn and implement new techniques and applications (Shekhar, 2019).

4.3 Automation and Artificial Intelligence:

In the emerging superpower, the automation and artificial are the rising technology and majority of the newest technologies which we can term as being super technologies which can change the strategic environment in various regions and the world. After the Russian President Vladimir Putin said Who lead in AI will lead the world (Vladimir Putin, 2017), then it can say both AI and AI based automation technologies are the superpowers, both technologies are quickly transforming nearly all spheres of life, and that is why, they are the superpowers of the 21st century, and they will change the strategic situation in the world radically. This creates a new dimension of global competition, also known as an "AI arms race" where algorithmic superiority, data handling and processing speed, no longer determines domination but physical resources. As AI Automation continues to improve, more businesses, organizations and companies are becoming more interested in

using technology to achieve efficiency and effectiveness in various processes. According to this mounting controversy, it is vital to perform a critical research on AI Automation on what it is, what other scholars have discovered about the subject, its notable uses, what the future has in store, and how the findings relate to America specifically (Yarlagadda, 2017).

4.4 Uses of AI in civilian and economic use in South Asia?

Artificial Intelligence has a critical function in South Asia both in the economics aspect and civilian use. In South Asian region where it is most populated is the world largest population is living due to the fact that the first and fourth most populated countries in the world are found in this region and Bangladesh being also very populous country. Considering the above scenario of India and Pakistan where more than 50 percent of the population is the youth. The young generation is the most vital in the economy of a nation. Artificial intelligence is a comparatively recent and developing technology and you are at the request of these technologies and it is employing it in various aspects of life to make profits such as in banking, agriculture, and healthcare among others. (PubMed, 2024)
Artificial Intelligence (AI) and machine learning (ML) can be used in various areas of food safety including disease and predictions etc. Such applications as machine learning, computer vision, predictive analytics algorithms, sensor networks, robotic inspection systems, and supply chain optimization tools have been implemented to help in various areas of food safety including early warning of outbreaks, risk prediction, detection and identification of food associated pathogens. At the same time, the desire to create the sustainable food system has encouraged the use of the latest technologies like Artificial Intelligence to enhance food security (Rugji et al., 2025). Artificial intelligence is revolutionizing all industries of life as I expound on agriculture. It is increasingly contributing in the finance of larger economic spheres, large small and middle manufacturing, resource management etc. In the civilian front or sphere where it allows people to work at home with the help of ML, introduce changes in the concepts and models of go governance.

4.5 Defenses and security uses and applications of AI.

Technology is evolving and coming with each and every minute of the world and each and every development has its possible challenges, opportunities and threats. Ever since the Stone Age, humanity has developed into the age of smartphone and AI. Similar to as atomic technology Artificial Intelligence trembling each aspect of life in the whole world within very short time span due to rapid communication technologies. It is beauty of technology that it is used in virtually all areas of life indefinitely. (Abid, 2023) However, the hard and destructive application of this technology is the use as defense purposes. Artificial intelligence is applied in intelligence, reconnaissance, and surveillance in the context of South Asian context. To that end AI was incorporated in satellites, drone cameras, and ground sensors and other apparatus and devices. AI supported lethal weapons systems are autonomous systems and have the least amount of human intervention and do not produce results as precise and superior. (Khurshid, Zaman, 2024)
The artificial intelligence may be employed in fallowing manners to the purpose of surveillance, in the LAWS Lethal autonomous weapon systems, aril vehicles that are unarmed and in the same way unmanned underwater vehicles to reconnaissance etc. LAWS has immense expectations and challenges, opportunities, and risks that are

involved in the full spectrum of military operations. The future of military operations will be affected by the LAWS and it will at least have an evolutionary impact but not a revolutionary one (CERNAT, 2022, Indrajaal 2026).

4.6 Potential challenges and threats to Pakistan Emerging technologies.

The changing, devastating, and emerging technologies like AI and others present challenges and threat to the national security of Pakistan and its relations with the historical opponent. Abilities of adversary like in the scenario of arms race spirals, the second-strike capability is acquired to exclude deterrence-failure in line with the rational deterrence theory (Tehsin et al., 2019). South Asia is undergoing the revolution of emerging technology and that has a bearing on the stability in the region. The fourth industrial revolution (4IR) is underway in which the world is witnessing the development of a new wave of technologies that are transformative and somewhat novel, such as artificial intelligence (AI), additive manufacturing, quantum information technology, hypersonic missiles, biotechnology, and directed energy.(Schwab,2016) Although the implications of these technologies on societies and economies are likely to be significant, the majority of them are dual use and will also impact the national security, including nuclear strategic stability (Kroenig, 2021). Nuclear stability can be compromised through cyber-attacks and merging of cyber technologies to traditional technologies and hypersonic missile systems. An increasing amount of literature is concerned that new technology would threaten nuclear strategic stability by affecting the nuclear second-strike capability or the dual- use capability, such as nuclear command, control, and communications. As an example, cyber-attacks and conventional hypersonic missiles could be used together to offer credible first- strike operations against enemy nuclear capabilities and advanced and directed- energy missile defenses may be used to absorb enemy nu clear retaliation. These new technologies can compromise nuclear strategic stability by targeting the second-strike capability of an enemy who has already been secured (Kroenig, 2021).

4.7 The Cyber technologies & Its domain:

The sphere of cyber technologies endow them with uniqueness of nature and character since each technology has grounds either on the sea or in the air but the cyber technology is out of space. The cyber battlefield is simultaneously deniable, borderless and third wave. States and non-state actors became free to play their games with no state boundaries and regulations because of its peculiarities. Cyber battle field also facilitates the hybrid form of warfare. Therefore, the concept of cyber warfare (sometimes used interchangeably in this book with the notion of cyber-attacks and cyber aggression) is used in a broad sense to communicate an interstate aspect in applying technological force in cyberspace (Green, 2015). The invention of armored vehicles, aircraft, ships and the invention of electronic and telecommunications have all pushed the battle space out and brought new and innovative methods of getting an advantage over the opponent. Since the technological breakthrough of flight led to a contest to conquer the skies, though, so too did the advent of cyberspace, bringing with it new strategic opportunities and threats that saw a scramble to establish a dominating presence within it (Robinson et al., 2015). The cases of cyber aggression undertaken in practice exhibit a significant increase in scale, and at least one of the latest cases. Case that results in physical harm, not an economic one (the so-called Stuxnet attack on Iran in 2010) (Granova & Slaviero, 2015).

4.8 The growth in cyber infrastructure of South Asia.

The development of cyber infrastructure is occurring very fast in South Asia particularly in the scenario of India and Pakistan. (World Bank, 2020) Cyber infrastructure is increasing, and data center, 5G networks, optical fiber and others will be established. It is a radical change in South Asia that is brought about by this technological infrastructure. This digitalization facilitates the technology interface in finance, commerce to defense form health care to agriculture, fine-tech to national security. The computing systems, data storage systems, high-order instruments and data repositories, visualization environments, and people that are interconnected by software and high performance networks make up cyber-infrastructure in an attempt to increase the efficiency of research and enable breakthroughs that otherwise would not be feasible (Stewart et al., 2010).

4.9 National security of Pakistan in danger of cyber attack.

The integration of emerging technologies most particularly cyber technologies in the national security paradigm of the South Asian countries is at high pace, hence posing challenges and opportunities. The non-state actors and state-sponsored actors are causing national security issues in that they are cyber committing on important, sensitive and strategic infrastructure in Pakistan. (NATO CCDCOE, 2021) To put it in simple terms, cyber can be said to be the amalgamations of two terms where one is the electronic media, internet communication means the combination that is based on the electronic devices and internet.

4.10 Space Technologies the Last Frontier:

The space is also being rapidly militarized by global and regional powers in a planned manner. Space was initially occupied with mere research work and commination but now it is militarized and geopolitical giants use it as a scientific frontier to the level of a critical arena of geopolitical rivalries particularly to USA, Russia, China and India (Harrison, 2020). On the one hand, the Americans, who now are the dominant power and the Russians, who now are the relegated power now batted over each other with the launch of a multiplicity of legacy space systems as spy satellites in the Low-Earth and Medium-Earth orbit and scavenged the open slots in the Geosynchronous orbit to gain a growing military presence. This has seen the emergence of a new space race, the competition of world supremacy by establishing space supremacy by the world superpowers of the modern era (Sarosh, 2024).

4.11 Indian and Pakistani space programs.

Nobel Prize winner scientist Dr. Abdus Salam of Pakistan introduced Pakistan space program in 1961 with the assistance of government of Pakistan which was referred to SUPARCO. Its development was initially irrefutable and in 1962 Pakistan fired first rocket identifiable as Rehmat rocket and it became the third nation to have such success in the Asian region and the tenth nation in the world to accomplish such a great feat in the space technological advancement. At the time when United States of America sponsored the space research and development of Pakistan through Pakistan space program or SUPARCO, Pakistan supported the scheme. Purposes, in the case of the space program in Pakistan, the period of 1961-1972 was very much cooperative with the United States.

In 1961, SUPARCO was formed as a committee that was tasked with the space program of Pakistan, and Dr. Abdus Salam was made the chairman (Miqdad & Jinyuan, 2019). The primary work of SUPARCO is to perform research in the field of space science and space technology and develop the field of peaceful use in the service of the country. It is concerned with creating space exploration applications (Mehdi and Su, 2019). The space program of India is created in 1960 by Dr. Vikram Sarabahi. To start with it launched a small sounding rocket. This was the first major breakthrough in the Indian Space history by ISRO who had launched its first satellite in 1975. The knowledge of rocket launching by the Indian scientists had been gained since 1963; 1963 to 1975 over three hundred U.S, French, Soviet, and British sounding rockets had been launched in the Thumba range, South India. At the bureaucratic level, an Indian National Committee for Space Research was set up in the Department of Atomic Energy, India in 1962. In 1969, the Indian Space Research Organization (ISRO) was established and the Indian Department of Space in 1972. The initial chairman of ISRO Vikram Sarabhai, helped convince the political leadership in India to allocate more funds in the Indian space program during a time when the country was facing financial difficulties in 1960 Sarabhai was also instrumental in the planning process of the gradual development of the Indian space program; his blue print was articulated in 1970 (Misty, 1998).

4.12 Missile and Hypersonic Technologies:

Hypersonic missile was invented, and the idea of the traditional war is transformed into warfare that has speed and accuracy and makes reaction time less. Traditional ballistic and curse missiles are not that fast and precise. Hypersonic missile is five times faster than the sound wave and has high maneuverability. Air-defense systems cannot detect these missiles. In South Asian security environment whereby both India and Pakistan have nuclear weapons missile delivery systems redefine the actual strategic landscape. Another emergent threat which may prove destabilizing particularly among the nuclear armed states is the hypersonic weapons. As a result of their agility, and rapidity, 8 hypersonic weapons can circumvent the ballistic missiles defence mechanism of the opponent. As China continues to develop its economic and military strength, and the US tries to keep its expansion at bay with the assistance of regional powers such as India, there are more chances that both South Asian rivals could be forced into another round of stability-instability, due to the increased competition between the two global powers (Sultan & Khursheed, 2021).

4.13 Progress in Nuclear and Missile Technology in South Asia.

Avert nuclearzation of South Asia leaves the power gape between the conventional powers of India and Pakistan with the authority of massiveness. Because the day on the one hand, India and Pakistan are engaged in hostility because of historical baggage, identity conflict, religious difference and state interests, ambitions and objectives. These were the forces that drove the two nations towards competition. The illegality of India in Kashmir in 1947, the declaration of war in 1965, and the break-up of Pakistan in 1971 are the reasons for fear in Pakistan. In order to overcome this fear and existential threat, Pakistan purchased nuclear weapons in 1998; the nuclear weapons of Pakistan guarantee the survival of Pakistan and provide it with strategic stability and deterrence. Once both state must have the nuclear weapons it requires. Credible nuclear deterrence is dependent on delivery systems. Purchasing nuclear weapons without a proper delivery system cannot

be valued (Khatoon, 2023). The states of India and Pakistan are not more than half a century old nuclear states. They are both continuing to address the needs of enhancing their missile ranges, accuracy, navigational effectiveness, and the strength of launch platforms and their command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) (Akhtar and Sethi, 2024).

4.14 Military Modernisation India and Pakistan.

The nuclear countries in South Asia including India and Pakistan are trying their level best in modernizing their military. The Indian resources are relatively higher than Pakistan and this is the reason why India has spent a substantial amount of financial resources to modernize the military. The Indian investment into modernization displeased Pakistan due to insufficiency of resources to match the it quantitatively, yet Pakistan concentrated on the qualitative modernization to counter the fear of Indian modernization Pakistan invested in the nuclear weapons to match it and provide deterrence. The recent years have seen headline grabbing growth in the Indian defense budget which has brought concerns that the on-going military modernization in India is putting at risk the delicate conventional military balance between India and Pakistan. This is the possibility that is used to justify the seeking of tactical-nuclear weapons and other activities by Islamabad that have ominous consequences over strategic stability in the subcontinent (Ladwig III, 2015). India is already the biggest purchaser of conventional arms in the world with more than a hundred billion dollars to be allocated to modernizing its defence forces in the coming decade. Therefore, some scholars and analysts have proposed that the Indian military modernization is posing a threat to conventional deterrence of Pakistan. Its result is in turn compelling them to adopt new nuclear weapons, especially low-yield warheads and delivery mechanisms to be used on the battlefield, so-called tactical nuclear weapons (Ladwig III, 2015).

4.15 Nuclear Policy transformation and changes in Pakistan.

Pakistan nuclear doctrine is not merely a piece of paper document that consists of set of principles that are founded on changing strategic challenges. With India maker its nuclear doctrine public in 2003, Pakistan, by liking ambiguity, did not publicly declare its doctrine. Rather it made declarations infrequently, via numerous official departments, to give some information on its nuclear policy. The intentional ambiguity worked to the benefit of Pakistan and has offered the nation greater freedom to alter its course of action as India kept developing its conventional and nuclear stance (Noor, 2023). The nuclear weapons of both nuclear states India and Pakistan have different purpose of their existence since nuclear weapons of Pakistan are purely aimed at security and defense centered on the other hand Indian nuclear weapons are not only meant to serve security but to expand Hindutwa ideology of Maha Baharat.

4.16 Quantum Technologies and National security

The effects of quantum technologies on national security are controversial because quantum technologies are both good and bad. The development of the Quantum technology and its application in the field of defensive technology is a paradigm shift, with far-reaching consequences to secure communications in the intelligence purposes. Quantum computing can intrude the encryption protocols that can easily compromise the

state secrets, military command, financial command and most importantly nuclear and strategic command and control system. Quantum technology is a new and possibly disruptive field, and can influence numerous human endeavors. Quantum technologies are a dual-use technology; hence, it is of concern to the defense and security sector and military and government actors (Krelina, 2021).

4.17 The Unmanned Systems and Robotics (Drones, UAVs, and UGVs)

The Unmanned Systems and Robotics represent a technological domain that has been linked to multiple facets of human endeavor, namely, security, finances, and technology. Autonomous weapons, unmanned vehicles, unmanned ground vehicles (UGVs) robots and all machines that are not subject to human interference are operated using machine learning or AI based technologies are supposed to be autonomous weapons. The qualitative and rapid development of the autonomous weapons sphere in defense and military changes the previous and traditional concept of strategic and national security. The desires of the powerful countries to seek advanced technologies, especially the rivalry between the US and China, have brought about complexities which impart on the strategic stability of South Asia. In particular, the US-India strategic alliance, which targets the countering of the influences of China, has posed security threats to Pakistan. The current situation is that the quest of India towards the emerging technologies has the potential of intensifying the deterioration of the strategic environment in South Asia. The technological developments in India and the adjustments in Indian doctrines in accordance with the shifts in global and regional political structures become a challenge to the deterrence stability in South Asia (Babar & Abbasi, 2024).

4.18 Key Findings The main findings of investigation follow.

1. Changing technologies to strategic environment of South Asia.
2. The current nuclear deterrence is being watered down as a result of incorporation of ETs.
3. The Indian military has had AI, LAWS playing a significant role in its doctrine that challenges the National security of Pakistan.
4. ETs increase second strike ability.
5. The easy access of ETs by Indian and its scale of economy compels Pakistan to invest in ETs that initiate a technological race.
6. Competing with Indian rapid advancement is not easy due to Indian size of economy and resources, which is difficult to compete with Pakistan.

4.19 Results

Strategic landscape of South Asia is changing owing to the emerging technologies. Within the South Asian strategic environment led by the emerging technologies particularly AI, LAWS, Cyber capabilities, hypersonic missiles and space technologies are bringing a new concept of warfare and deterrence. • Indian adoption of new technologies in its defense sector is threatening Islamabad. The technologies are a quantum computing, AI autonomous weapon systems, air defense that is bought in Russia (S-400) enhance Indian

defensive and offensive capabilities that undermine the central deterrence capabilities and strategic stability of Pakistan. Economic resources and strategic advantages of India. The Indian economy and resources and its easy access to technological market like the United States of America, Russia, Israel and other developed nations gives him the upper hand over Pakistan. Pakistan has strategic limitations. Poor governance, educational, infrastructural problems, and unstable economy and political atmosphere are some of the challenges that Pakistan experiences. There are opportunities and challenges in Pakistan. Pakistan enjoys close relations with China and it can acquire emerging technologies and develop in-house by transferring technologies and improving skills and capacities of the population.

5.1 Strategic and Security Situation Threats in Pakistan.

The internal factors are political instability, economic vulnerability internal security, governance and a myriad of other undeniable factors that are afflicting the security and strategic environment of Pakistan with their complex provisions by several folds both on a formal and informal basis. Outside the Pakistani front, the country is in an unhealthy relationship with the two countries; Afghanistan and Iran (Relationship with Iran is slowly yet relatively improving). Third and most essential front is India which is an arch enemy of Pakistan and fights three wars and divides Pakistan into two which came in 1971. Strategic and security problems to Pakistan are being exerted by the presence of scenarios and strategic goals and ambitions in the setting of nuclear weaponry by external powers and competitors. Terrorism, political instability, border issues, cyber vulnerability and socio-economic forces are some of the factors that characterize the security environment in Pakistan. The Indian strategic ambitions in the area and against Pakistan propelled by its economic prosperity and favored by the goodwill of the Indo -US nexus have been on the increase and have been given a special impetus by the Hindutva of the BJP. This is a disgrace since in the post- 9/11 climate of Islam-phobia and even a challenge of the meaning of our own being, the Two- Nation Theory, has been watered down to a harmless form of national consensus (Haque, 2019).

5.2 Economic and Infrastructure Constraints.

The traditional national security thinking was military and defence based however this time around the traditional thinking will be subject to change. Economy is assumed as one of the most national security threats. The existence of weak economies will not be ensured in the international system. Security in the sense of economics takes place at the nation level. Economic and infrastructural constraints are being faced in the country of Pakistan. Being a developing country, and a country with an active socio-economic environment, Pakistan faces various problems with ensuring the economic security of the population (Sheikh et al., 2022). These factors taken together economically and infrastructurally, form a vicious cycle of limitations to strategic positioning of Pakistan. The solutions offered in the literature are concentrated on a number of themes;

(1) Amplifying domestic revenue collection and financial management in order to create fiscal space to make investments of strategic value;
(2) Seeking resilient and climate-resilient infrastructure (energy, transport, communications);
(3) The improvement of local governance and community involvement in the major projects to diminish the risk of sabotage, and

(4) Diversifying energy and defense supply chains with a combination of indigenization and multilateral relationships.

In their absence, only short-term requirements of financial stabilization, disaster management, and externally funded infrastructural projects the results of which are predetermined by the governance and debt problems will be available to the strategic decisions of Pakistan (World Bank, 2025b).

5.3 Human resource and education barriers.

To achieve national security and overcome the security and existential challenge states have to invest in the human capital building and remove the barrier to education in order to provide the quality education in the modern skills. The human capital remains as one of the greatest structural limitation to the development and national security of Pakistan. The outcomes in the sphere of Pakistan in terms of health, education, and skills acquisition have slightly changed over decades and are not equally distributed between provinces and socioeconomic classes, as it can be seen according to the Human Capital Index and the reviews by the World Bank.

5.4 Multidirectional Policy and Governance Barriers.

Every powerful, dynamic and strong country needs good governance to prosper. The weak governing states cannot ensure their survival in the international communities week rulings place hiccups in both the domestic and international fronts politically, economically, and strategically. The essential pillar to the presence of democracy, human rights, and economic development is rule of law, and with the help of Pakistan, it is in a critical crisis in the area that is a major challenge to national security of the nation (Imran and Kazmi, 2025).

5.5 Regional Competitions and Geopolitical Strains.

The unstable geopolitical environment of the Islamabad city is because of the rivalry with India and unstable political, economic and military relationship with Afghanistan. The time-honored adage that enemy is friend and enemy is enemy now the case is no different with Pakistan in the south Asian region as India is taking charge in Afghanistan and it is playing its evil game against state of Pakistan. This puts Pakistan in geopolitical pressure. Strong rivalry among dominant state actors value competition - especially between China and the United States brings South Asia to the strategic complexity and increasing relations between Pakistan and China (strategic, economic, military) are linked to the support of the important investment as well as diplomatic aid and is likely to suggest regional backlash. Conversely, the US strategic presence (defense cooperation, intelligence sharing and technological partnerships) to India influences the region balance and compels Pakistan to rethink its alliances.

5.6 U.S.–India Close Cooperation

One of the most significant effects of the place in the context of the Pakistan safety calculus is the strategic alliance between America and India that is moving towards agreements of protection, sharing of intelligence, relation to the region, and financial

relation. The U.S and India have tightened their interaction on the strategic level taking numerous steps since 2010s with the help of the agreements which determine the beauty of interoperability and geospatial cooperation. Academic reviews warning of the facts that, such features upset the statistics equilibrium of forces in the inner environment and trigger emergent strategic difficulties to Pakistan (Lou, 2024). Basic Exchange and Cooperation Agreement (BECA) and COMCASA are the initial agreements that enhance the geospatial focus of India on and reliable communications interoperability with the U.S that can beautify the India focus of the situation in the maritime and cross-border environments. Such agreements, according to policy briefs and commentary in the educational establishments, help reduce the friction in mixed operations and possibly lead to the calculation of deterrence in Pakistan becoming hard, that is to say, in the event that India obtains enhanced surveillance and concentrating on the facts increases.

5.7 Strategic Opportunities: Pakistani power of Technologies.

The modern level of technology can be called a strategic multiplier which alters the way in which value is created in the economy, power is practiced by the states and how citizens use the services and the way they participate in the process of governance. In the situation of a country such as Pakistan that has suffered long-term macroeconomic feebleness, a rural large populace, and a high level of strategic interests in its region, technological adoption is a cross-cutting device that is sensible. It can be used to achieve productivity, resilience, and inclusion together with the use of distributed and renewable energy technologies, digital health and education, cyber security capabilities, and technological collaborations in the region with properly aligned digital public infrastructure (DPI). However, technological opportunity is not handed to them on a silver platter, it requires systematic investment in collective goods (e.g. broadband, identity systems and payment rails), human capital, effective regulation and strategic alliances across borders that is about capacity transfer rather than unidirectional dependence (McAfee and Brynjolfsson, 2017).

5.8 Economic Growth and Technological Transformation.

Technological transformation is one of the greatest contributors of greater productivity and structural change. At the economy-wide level, there are three mechanisms.
Firstly, digital public goods like interoperable digital identity, secure instant payments systems and shared data exchanges reduce the transaction and verification costs and allow firms to scale and households to access services at low costs. Such a platform is the Raast instant payment system (introduced and scaled with the participation of central banks) deployed in Pakistan, which provides low-cost, in-real-time transfer, an example of which is: facilitating formalization of transactions, speeding up the process of government-to-person (G2P) payments, and the catalyst of an e-commerce adoption in the face of an increase in POS systems and merchant boarding (State Bank of Pakistan, 2022).
Second, the micro-businesses and the women are turned into obstacles of formal savings and credit through the fine-tech and mobile financial services, enhancing productive investment and spending in the stormy conditions.

Third, the digital environment and work-at-home jobs develop new exportable services and freelance revenues that are not as dependent on local infrastructure as more

conservative production does, providing a different source of foreign exchange income and job.

5.9 Economic Growth and Stability.

The modern level of technology can be called a strategic multiplier which alters the way in which value is created in the economy, power is practiced by the states and how citizens use the services and the way they participate in the process of governance. In the situation of a country such as Pakistan that has suffered long-term macroeconomic feebleness, a rural large populace, and a high level of strategic interests in its region, technological adoption is a cross-cutting device that is sensible.

5.10 Technological use to enhance National Security.

The modern security environment is based on information supremacy, cyber resilience and operational capability in the competitive online space that is critical in aiding the adolescents to survive peer and familial influences. Cyber threats require particular technical resources, legal frameworks, and the sense of whole-of-society approach, such as the necessity to protect important infrastructure, build the capacity to respond to incidents, and manage it between the government and non-government sectors, which is why legal clarity, including cybercrime laws and data protection policies, is identified in Pakistan as the National Cyber Security Policy (2021) and future planning meetings (S. Ahmad, 2022). The Digital Economy Enhancement Project DEEP (2023) project by the World Bank is intended to increase the ability of the government to provide digital services to the citizens, establish the platforms to identify people and share data, and protect the personal data all of which will help the innovations of the privately owned companies and the delivery of the better services to the government (Bezzina, 2023).

5.11 Social Progress and Sustainable Development.

Technology may play a significant role in enforcing the achievement of sustainable development in Pakistan, especially because the poor citizens of this nation are susceptible to environmental risks, services remain inaccessible and there is lack of energy. Pakistan is prone to floods, drought and changes in glacier melting which cause huge loss to the economy and even puts the dwelling population at risk of displacement. AI technologies have the potential of reducing such problems in three major ways that include energy, climate-smart agriculture and disaster preparedness and better delivery of health and education services. In as far as energy and environmental sustainability is concerned, the energy system within Pakistan has never ceased to be distressed with insufficiency and high costs of imported gasoline. The studies show that there are prospects of much renewable energy in Pakistan including solar, wind and hydropower.

5.12 Conclusion

This study examines South Asian strategic implications of emerging technologies, challenges and opportunities of emerging technologies to Pakistan. The Indian easy access to international technological market and relations with United States of America Russia and other western first world countries are guaranteeing to gain access to the advanced and emerging technologies to modernization of its military. The combination of

destructive technologies, AI, autonomous weapons, UAVs, anti-satellite weapons, hypersonic missiles systems and high speed and fifth generation stealth fighter jets, air defense systems brought the region into the unstable stage. South Asia is already struggling with the issue of stability as there are hegemonic ambitions of India and massive asymmetric gape between traditional opponents India and Pakistan. The current nuclear deterrence established by nuclear weapons made by Pakistan whose main aim is to have credible minimum deterrence is jeopardized by the fast growing modernization of military power by the Indian through the integration of emerging technologies in nearly all military fields. Pakistan also enjoys opportunities in this unstable strategy and security environment in South Asia. Pakistan can obtain the emergent technologies by its all-weather relationship with emerging technological and economical giant China and, by investing in its younger generation to develop home grown technologies.

References

1. Abbasi, R., & Uzzaman, M. S. (2022). Strategic Stability of South Asia in the Age of Artificial Intelligence. Pakistan Horizon, 75(4), 39–60.

2. Afzaal, M. (2020). The China-Pakistan economic corridor of the Belt and Road Initiative concept, context and assessment: by Siegfried O. Wolf, Switzerland, Springer, 2020, 404 pp.,£ 88 (hardback), ISBN 978-3-030-16198-9 (Vol. 26, Issue 5). Taylor & Francis.

3. Ahmad, M., & Munir, M. (2025). Renewable Energy Transition in Pakistan: Policy Challenges and Opportunities. Annual Methodological Archive Research Review, 3(8), 620–634.

4. Ahmad, S. (2022). Cyber security threat and Pakistan's preparedness: An analysis of national cyber security policy 2021. Pakistan Journal of Humanities & Social Sciences Research, 5(1), 33.

5. Akhtar, R., & Sethi, M. (2024). Emerging Technologies and Southern Asian Nuclear Deterrence. The Washington Quarterly, 47(4), 99–116.

6. Ali, S., Shah, S. Z. H., Qureshi, S. N., & Tanveer, S. (2022). Impact of Cyber-Terrorism on National Security of Pakistan. PalArch's Journal of Archaeology of Egypt/Egyptology, ISSN, 1456–1468.

7. Arif, S. (2019a). Emerging Trends of Artificial Intelligence in South Asia and its Implications for Pakistan. NUST Journal of International Peace & Stability, 55–66.

8. Arif, S. (2019b). Emerging Trends of Artificial Intelligence in South Asia and its Implications for Pakistan. NUST Journal of International Peace and Stability, II(2), 55–66. https://doi.org/10.37540/njips.v2i2.31

9. Ashraf, M. N., & Kayani, S. A. (2023). India's Cyber Warfare Capabilities: Repercussions For Pakistan's National Security. NDU Journal, 37, 34–45.

10. Babar, S. I., & Abbasi, A. H. (2023). Emerging technologies and the threat to South Asian security. CISS Insight Journal, 11(2), P40-59.

11. Babar, S. I., & Abbasi, A. H. (2024). Autonomous Weapons Systems and the Changing Security Dynamics of South Asia. INSTITUTE OF REGIONAL STUDIES ISLAMABAD, 42(1), 3–32.

12. Bezzina, J. (2023). Appraisal Environmental and Social Review Summary (ESRS)-Islamic Republic of Pakistan: Digital Economy Enhancement Project-P174402.

13. Bosbotinis, J. (2018), Hypersonic Missiles: What are they and can they be stopped?,

(A hypersonic missile travels at speeds of Mach 5 and higher - five times faster than the speed of sound (3836 mph), which is around 1 mile per second. Some missiles, such as Russia's Kh-47M2 Kinzhal air-launched ballistic missile, are allegedly capable of reaching Mach 10 speeds (7672 mph) and distances up to 1200 miles.) https://www.defenceiq.com/defence-technology/articles/hypersonic-missiles-what-are-they-and-can-they-be-stopped

14. Breene, K. (2016). Who are the cyberwar superpowers. World Economic Forum, 4(05).

15. CERNAT, R. (2022). "Lethal Autonomous Weapon Systems – Emerging and Potentially Disruptive Technology." Romanian Military Thinking, 2022(4), 10. https://doi.org/DOI: 10.55535/RMT.2022.4.08

16. Childs, Steven J. (2021), Developing nations, drones and deterrence: Unmanned aerial vehicles and small nuclear powers, January 2021 Comparative Strategy 40(1):1-17

https://www.researchgate.net/publication/348673120

17. Davies, J. (2011). Selected issues. Journal of Water Law, 22(5), 215–218. https://doi.org/10.1007/978-1-4684-3821-5_16

18. Ellahi, M. (2025). CPEC Sustainable Development : Opportunities and Challenges. PIDE "Discourse Magazine," 61–66. https://pide.org.pk/research/cpec-sustainable-development-opportunities-and-challenges/

19. Farooq, A. (2024). The Acquisition of Modern Technologies by the Indian Military: Strategic Security and Geopolitical Implications for Pakistan. Global Strategic & Security Studies Review, 9(3), 62–68.

20. Favaro, M., & Williams, H. (2023). False sense of supremacy: Emerging technologies, the war in ukraine, and the risk of nuclear escalation. Journal for Peace and Nuclear Disarmament, 6(1), 28–46.

21. French, Ryan. W.(2015). Pakistan's Tactical Nuclear Weapons: Implications for Strategic Stability in South Asia, PAKISTAN'S TACTICAL NUCLEAR WEAPONS, Journal of National Security Stuies, luce.nt, February 2015, pp.11-22

https://www.researchgate.net/publication/319365628_Pakistan's_Tactical_Nuclear_Weapons_Implications_for_Strategic_Stability_in_South_Asia

22. Granova, A., & Slaviero, M. (2015). Cyber Warfare A multidisciplinary analysis. In J. A. Green (Ed.), Routledge (1st Editio). Routledge. https://doi.org/10.1016/B978-0-12-803843-7.00083-1

23. Green, J. A. (2015). Cyber warfare. Taylor & Francis.

24. Haq, E. U. (2019). Pakistan: National Security Challenges and the Way Forward. Pakistan Horizon, 72(4), 113–120.

25. Haq, Riaz, (2020), MOSAIC WARFARE: SMALL AND SCALABLE ARE BEAUTIFUL, http://www.riazhaq.com/2020/12/pakistani-military-launches-defense-ai.html

26. HEYWOOD, A. (2011). Global Politics. Palgrave Macmillion.

27. Hussain, R. (2020). Deterrence and nuclear use: Doctrines in South Asia. In The India-Pakistan Nuclear Relationship (pp. 151–184). Routledge India.

28. Imran, M., & Kazmi, S. S. (2025). The Rule of Law Crisis and its Implications on National Security in Pakistan. Journal of Political Studies, 32(1), 36–57.

29. Javed, N., & Altaf, Z. (2024). India-Pakistan Development of Drones. Strategic Studies, 44(2), 44–66.

30. Johnson, J. (2020). Artificial intelligence: A threat to strategic stability. Strategic Studies Quarterly, 14(1), 16–39.

31. Johnson, J. (2021). The fast and the furious: Drone swarming and hypersonic weapons. In Artificial intelligence and the future of warfare (pp. 128–149). Manchester University Press.

32. Khalid1, M. M. U., & Ms. Saleha Masood. (2024). Military Application and Integration of AI: Implications for South Asian Security Paradigm. Journal of Policy Researc, 2(4), 10. https://doi.org/https://doi.org/10.61506/02.00255

33. Khan, A. (2023). Understanding trajectories of refugee inclusion in national education systems: Policy and data perspectives from Pakistan. 48223.

34. Khan, F.,H., (2022). Strategic Risk Management in Southern Asia. Journal for Peace and Nuclear Disarmament. Volume 5, 2022 - Issue 2, Pp. 369-393. https://doi.org/10.1080/25751654.2022.2136878

35. Khan, M. F., Raza, A., & Naseer, N. (2021). Cyber security and challenges faced by Pakistan. Pakistan Journal of International Affairs, 4(4), 865–881.

36. Khan, M. I. A. (2019). CYBER-WARFARE: IMPLICATIONS FOR THE NATIONAL SECURITY OF PAKISTAN. NDU Journal EBSCO. https://openurl.ebsco.com/EPDB%3Agcd%3A9%3A32468137/detailv2?sid=ebsco%3Aplink%3Ascholar&id=ebsco%3Agcd%3A151417405&crl=c&link_origin=scholar.google.com

37. Khan, S. (2022). The China-Pakistan economic corridor: A flashpoint of regional competition. Retrieved on Jan, 8, 20222.

38. Khan, Z. (2015). Pakistan's nuclear first-use doctrine: Obsessions and obstacles. Contemporary Security Policy, 36(1), 149–170.

39. Khanijo, R. (2022). Understanding Nuclear Postures, Weapons and Technologies in South Asia. National Security Journal, 3(4). https://doi.org/10.36878/nsj20220227.07

40. Khatoon, N. (2023). Nuclear Missile Development Trends in Southern Asia: An Analysis from 2011 to 2021. In The Global Nuclear Landscape (pp. 174–188). Routledge.

41. Khurshid, T. (2023). The impact of artificial intelligence militarization on South Asian deterrence dynamics. BTTN Journal, 2(2), 134–150.

42. Krelina, M. (2021). Quantum technology for military applications. EPJ Quantum Technology, 8(1), 24.

43. Kroenig, M. (2021). Will Emerging Technology Cause Nuclear War? Strategic Studies Quarterly, 15(4), 59–73.

44. Ladwig III, W. C. (2015). Indian military modernization and conventional deterrence in South Asia. Journal of Strategic Studies, 38(5), 729–772.

45. Li, H., Hameed, J., Khuhro, R. A., Albasher, G., Alqahtani, W., Sadiq, M. W., & Wu, T. (2021). The impact of the economic corridor on economic stability: a double mediating role of environmental sustainability and sustainable development under the exceptional circumstances of COVID-19. Frontiers in Psychology, 11, 634375.

46. Lobell, S. E. (2010). Structural realism/offensive and defensive realism. In Oxford research encyclopedia of international studies.

47. Lou, C. (2024). US–India defense cooperation: progress, motivation and constraints. China International Strategy Review, 6(2), 305–318.

48. Manning, R. (2020). Emerging Technologies: New Challenges to Global Stability ISSUE BRIEF. https://www.internetworldstats.com/stats.htm.

49. Manning, R. A. (2020). Emerging technologies : New challenges to global stability. Atlantic Council, 2020, 0–25. The future contribution of the European nternet industry under the three

50. Masood, M., & Baig, M. A. (2023). POTENTIAL IMPACT OF LETHAL AUTONOMOUS WEAPON SYSTEMS ON STRATEGIC STABILITY AND NUCLEAR DETERRENCE IN SOUTH ASIA. Margalla Papers, 27(2).

51. Mazari, S. M. (2004). Understanding Pakistan's Nuclear Doctrine. Strategic Studies, 24(3), 20. https://www.jstor.org/stable/45242536

52. McAfee, A., & Brynjolfsson, E. (2017). Machine, platform, crowd: Harnessing our digital future. WW Norton & Company.

53. Mehdi, M., & Su, J. (2019). Pakistan space programme and international cooperation: history and prospects. Space Policy, 47, 175–180.

54. Misty, D. (1998). India's emerging space program. Pacific Affairs, 151–174.

55. Morhenthau, H. J. (1954). Politics among nations.pdf (p. 670).

56. Mukhtar, M. (2020). Issue Brief on "India-US Military Agreement: BECA and its Implications for the Region." Institute Of Strategic Studies Islamabad, 17.

57. Noor, S. (2023). Pakistan's Evolving Nuclear Doctrine. Arms Control Today, 53(8), 12–17.

58. Putin, V., Who Vladimir Putin thinks will rule the world, CNN, Sat September 2, 2017. https://edition.cnn.com/2017/09/01/world/putin-artificial-intelligence-will-rule-world

59. Rafiq, A. (2021). Militarisation of artificial intelligence and future of arms control in South Asia. Strategic Studies, 41(2), 49–63.

60. Robinson, M., Jones, K., & Janicke, H. (2015). Cyber warfare: Issues and challenges. Computers & Security, 49, 70–94.

61. Rugji, J., Erol, Z., Taşçı, F., Musa, L., Hamadani, A., Gündemir, M. G., Karalliu, E., & Siddiqui, S. A. (2025). Utilization of AI–reshaping the future of food safety, agriculture and food security–a critical review. Critical Reviews in Food Science and Nutrition, 65(26), 5136–5180.

62. S. Naz, & Mujaddid, G. (2025). Technological Determinism and Strategic Stability: Implications of IndianHypersonic Weapons Technology for Pakistan., Journal of Regional Studies Review (JRSR), Vol. 4(4), 11-19.

https://www.researchgate.net/publication/399193319

63. Sarosh, A. (2024). Space Contest 3.0–Strategic Implications of Technology Trends on the Growing Power of Contestation in Space. Journal of Security and Strategic Analyses, 10(2), 5–23.

64. Sechser, T. S., Narang, N., & Talmadge, C. (2019). Emerging technologies and strategic stability in peacetime, crisis, and war. Journal of Strategic Studies, 42(6), 727–735. https://doi.org/10.1080/01402390.2019.1626725

65. Sehgal, V. (2024). Integration of Artificial Intelligence in Indian Military Operations: an Overview. International Journal For Multidisciplinary Research, 6(4), 1–12. https://doi.org/10.36948/ijfmr.2024.v06i04.26311

66. Shah, Z. (2025). An analysis of security challenges to Pakistan at present. Contemporary Journal of Social Science Review, 3(1), 220–235.

67. Sheikh, M. A., Ahmed, S. M. Bin, & Rana, A. A. (2022). Economic security in Pakistan: indicators, issues, impacts and way forward. Pakistan Journal of Social Research, 4(1), 990–999.

68. Shekhar, S. S. (2019). Artificial intelligence in automation. Artificial Intelligence, 3085(06), 14–17.

69. Silva, A. L. R. da. (2004). Introdução às Relações Internacionais: temas, atores e visões. Revista Brasileira de Política Internacional, 47(1), 191–194. https://doi.org/10.1590/s0034-73292004000100012

70. Sonoura, K. (2018). India, Japan to introduce AI, robotics in defence sector. Times of India, 1–3. https://timesofindia.indiatimes.com/india/india-japan-to-introduce-ai-robotics-in-defence-sector/articleshow/62597018.cms

71. State Bank of Pakistan. (2022). Payment Systems Review. State Bank of Pakistan, 1–15.

72. Steinbruner, J. D. (1978). National security and the concept of strategic stability. Journal of Conflict Resolution, 22(3), 411–428.

73. Stewart, C. A., Simms, S., Plale, B., Link, M., Hancock, D. Y., & Fox, G. C. (2010). What is cyberinfrastructure. Proceedings of the 38th Annual ACM SIGUCCS Fall Conference: Navigation and Discovery, 37–44.

74. Sultan, D. A., & Khursheed, I. (2021). Hypersonic Weapons in South Asia: Implications for Strategic Stability. IPRI Journal, 21(01), 61–81. https://doi.org/10.31945/iprij.210103

75. Tehsin, M., Qumber, G., & Ali, A. (2019). Strategic stability in South Asia: Pakistan and the Challenges of nuclear deterrence. South Asian Studies, 34(01), 333–346.

76. Waseem, Ahmad, (2025). Analyzing Pakistan's Success in the 2025 Indo-Pak War Amid US-China Strategic Rivalry, Dialogue Social Science Review (DSSR), www.thedssr.com ISSN Online: 3007-3154ISSN Print: 3007-3146, Vol. 3 No. 11 (November), (2025), pp. 322-333

https://www.researchgate.net/publication/399027665

77. Walton, C. Dale, Colin S. Gray (2013). Chapter 3, The Geopolitics of Strategic Stability : Looking Beyond Cold Warriors And Nuclear Weapon, ISBN 1-58487-562-3,U.S. Army War College,Strategic Studies Institute,47 Ashburn, Drive,Carlisle,PA,17013-5010. p. 89. https://apps.dtic.mil/sti/tr/pdf/ADA572928.pdf

78. World Bank. (2025a). Human Capital Country BRIEF.

79. World Bank. (2025b). Pakistan Federal Public Expenditure Review 2023. https://doi.org/https://doi.org/1 0.1 596/41 482

80. World Bank Groups. (2022). Pakistan Human capital review. In Building Capabalities throughtout life.

81. Yarlagadda, R. T. (2017). AI Automation and it's Future in the UnitedStates. International Journal of Creative Research Thoughts (IJCRT), ISSN, 2320–2882.

82. Johnson, j. (2022). Artifical intelligence: A threat to strategic stability. Strategic studies Quaterly https://www.airuniversity.af.edu/Portals/10/SSQ/documents/Volume-14_Issue-1/Johnson.pdf

83. Secher, T.S, Narang, N., Talmadge, C. (2019). Emerging technologies and stategic stability in peacetime,crisis and war. Journal of Strategic studies,

https://doi.org/10.1080/01402390.2019.1626725

84. Khan, F. H., (2022). Srategic Risk management in southern Asia. Journal of peace and nuclear disarmament. https://doi.org/10.1080/25751654.2022.2136878

85. Sultan, D. A., Khursheed, I., (2021). Hypersonic weapons in south Asia: Implications for strategic stability. IPRI journal. https://journal.ipripak.org/wp-content/uploads/2021/07/Article-3-IPRI-Journal-XXI-1.pdf

86. Tehsin, M., Qumber, G.,& Ali, A. (2019) Strategic Stability in South Asia. South asia studies https://pu.edu.pk/images/journal/csas/PDF/20_v34_1_19.pdf

87. Mazari, S.M., (2004)Understanding Pakistan's nuclers doctrine. Strategic Studies. https://www.jstor.org/stable/45242536

88. Waltz, K. N., (1979) Theory of International Politics. Addison-weasley https://www.academia.edu/28686609/_WALTZ_KENNETH_Theory_of_International_Politics

89. Small, A. (2015). The China-Pakistan axis. Oxford University press. https://academic.oup.com/book/7599?

90. Alberts, D.S., & Hayes, R.E. (2003) Power to edge. CCRP. http://www.dodccrp.org/files/Alberts_Power.pdf

91. Russell, S.,Norvig, P. (2021). Artificial Intelligence: A modern approach.Pearson. https://aima.cs.berkeley.edu/

92. Cummings , M. (2017) . Artificial Intelligence and the future of warfare. Chatham house. https://www.chathamhouse.org/2017/01/artificial-intelligence-and-future-warfare

93. Sarwar, M.,Babar, S. I., (2025), AI militarization in south Asia: A comparitive Analysis,BTTN journal https://bttn.org.pk/ojs/index.php/BTTN_Journal/article/view/181

94. Indrajaal Autonomous Drone Defense Dome.(2026) https://en.wikipedia.org/wiki/Indrajaal_Autonomous_Drone_Defence_Dome

95. Khurshid, T., Zaman, H.,(2024), AI integration in Indian military: Appraisal of Security Apprehensions For south Asia, NDU Journal https://ndujournal.ndu.edu.pk/site/article/view/179

96. PUBMED, (2024) , AI can empower agriculture for global food security:challenges and prospects in developing nations https://pubmed.ncbi.nlm.nih.gov/38726306/

97. Abid, A.A., (2023), Artificial intelligence and South Asian strategic stability, SouthAsia Journal https://southasiajournal.net/artificial-intelligence-and-south-asian-strategic-stability

98. Schwab, K., (2016). The fourth industrial revolution. World Economic Forum https://www.weforum.org/stories/technological-innovation/

99. Robinson, N., (2015). Cyber security, Cyber war and Cyber terrorism. RAND. https://www.rand.org/pubs/research_reports/RR1024.html

100. World Bank. (2020). Digital development overview https://www.worldbank.org/en/topic/digital

101. NATO CCDCOE. (2021). Cyber threats and artifical infrastructure https://ccdcoe.org/library/publications/

Harrison, T., Johnson, K., Young, M., (2020) Space Threats Assesment. CSIS. https://www.csis.org/analysis/space-threat-assessment-2020