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DEFENSE RESOURCES MANAGEMENT IN THE 21ST CENTURY

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COMMANDING OFFICERS' ROLE IN MOTIVATING PEOPLE

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Abstract

This essay offers an in-depth exploration of the critical role commanding officers play in fostering motivation among their personnel, both in military and broader organizational settings. Motivation is not merely a supplemental aspect of leadership — it is a cornerstone of effective command, directly influencing mission readiness, unit cohesion, morale, and long-term organizational performance. The essay begins by examining the significance of motivation in high-pressure environments, where mental resilience, trust, and clarity of purpose are essential. It then evaluates the comparative strengths of transformational and transactional leadership styles, noting that effective leaders often incorporate both approaches to achieve a balance between visionary inspiration and structured accountability.

Beyond leadership theory, the essay delves into practical methods of motivation, including the power of recognition and feedback, the necessity of transparent and empathetic communication, and the importance of providing opportunities for growth and development. These elements, when delivered consistently, build trust and psychological safety, allowing individuals to thrive. The paper also emphasizes the commanding officer's role as a role model — someone who leads by example in integrity, courage, and dedication, reinforcing the values they wish to instill in their team. Attention to personnel well-being, both physical and psychological, emerges as a key leadership responsibility, especially in environments that demand sustained performance under stress. The essay concludes by asserting that motivation cannot be commanded; it must be inspired through authentic leadership, emotional intelligence, and a deep investment in people. In doing so, commanding officers not only ensure tactical success but also cultivate an enduring legacy of respect, loyalty, and excellence.

Keywords: *motivation; hierarchy; leadership; effectiveness; collective success.*

Introduction

In every structured and hierarchical institution—whether military, corporate, or civic—leadership is a fundamental determinant of collective success. Within the military, commanding officers play a particularly crucial role not just in strategic decision-making, but in inspiring and energizing the people under their command. The effectiveness of any military unit is not solely dependent on tactics or firepower, but also on the morale, dedication, and motivation of its personnel.

The role of commanding officers has evolved from being merely enforcers of discipline and strategy to becoming motivators, mentors, and emotional anchors. In high-stress, high-stakes environments such as the military, where personnel are constantly exposed to physical danger, emotional strain, and psychological fatigue, the ability of a commanding officer to motivate and uplift their team becomes indispensable. Their leadership can determine whether individuals feel valued, engaged, and committed — or whether they become demoralized and disengaged.

This essay explores how commanding officers motivate those under their command by examining their leadership styles, emotional intelligence, communication skills, recognition practices, and concern for overall well-being. It argues that effective motivation stems not only from authority but from empathy, empowerment, and example-setting — qualities that transform a commander from a superior into a true leader.

1. Leadership Style and Its Impact on Motivation

The style of leadership adopted by commanding officers greatly influences the motivation of their subordinates. In military and organizational settings, commanding officers employ various leadership styles, each with distinct effects on motivation. Understanding these styles, particularly transformational and transactional leadership, provides valuable insights into how commanding officers can effectively inspire and motivate their personnel. Transformational leaders inspire and empower their subordinates by creating a vision, fostering an environment of trust, and encouraging innovation. They focus on personal development and intrinsic motivation. In contrast, transactional leaders emphasize discipline, order, and a system of rewards and punishments.

In military settings, a balance between the two styles is often necessary. Commanding officers who are too authoritarian may stifle initiative and breed resentment, while those who are too lenient may compromise discipline. Effective leaders adapt their style based on the needs of the unit and the situation, demonstrating flexibility and situational awareness. By doing so, they cultivate respect, loyalty, and motivation among their personnel.

1.1 Transformational Leadership

Transformational leadership is characterized by the ability to inspire and elevate followers by creating a shared vision and fostering an environment of trust and collaboration. Commanding officers who adopt this style focus on several key components that enhance motivation:

Transformational leaders inspire a *shared vision* by articulating a compelling purpose that resonates with personnel, helping them connect their individual roles to broader organizational goals. This intrinsic motivation fosters pride in their contributions and drives engagement [1, 6]. They emphasize *individualized support*, understanding each team member's unique needs and aspirations, which fosters a sense of belonging and value, ultimately enhancing performance [1, 7]. *Building trust* and respect is fundamental; when leaders demonstrate integrity and genuine concern, they create a secure environment that motivates collaboration [1, 43]. Additionally, transformational leaders *encourage innovation and creativity* by promoting a culture where ideas can flourish, empowering team members to think outside the box [1, 53]. Finally, by *fostering personal development* through training and career advancement opportunities, leaders show their investment in their personnel's futures, significantly boosting motivation and commitment to the team's success [1, 153].

Rear Admiral Chester Nimitz's leadership following the Pearl Harbor attack in December 1941 stands as a prime example of transformational leadership in a military context. Confronted with a demoralized and disorganized Pacific Fleet, Nimitz implemented a series of strategic initiatives aimed at restoring morale, building strong relationships, empowering his subordinates, and articulating a clear vision for eventual victory. He quickly reassured his staff, expressing confidence in their abilities to recover and prevail. By actively touring facilities and engaging with personnel, he fostered trust and demonstrated empathy, crucial for rebuilding team cohesion. Nimitz also encouraged initiative by decentralizing decision-making, which allowed his officers to take ownership of their roles. His calm demeanor and unwavering resolve inspired confidence among the fleet, leading to a rapid improvement in morale. This revitalization facilitated the swift repair of damaged ships and the integration of new vessels, ultimately transforming the Pacific Fleet into a formidable fighting force. The successful execution of pivotal strategies in key battles, such as the Battle of the Coral Sea and the Battle of Midway, underscored the effectiveness of his leadership. Nimitz's ability to create a culture of innovation and adaptability was critical in overcoming the challenges posed by a technologically advanced enemy across vast oceanic distances. His leadership

not only revitalized a defeated fleet but also highlighted the essential qualities of character, vision, and empathy that define effective military leadership [2].

1.2 Transactional Leadership

In contrast, transactional leadership relies on a system of rewards and punishments to motivate personnel. This style is characterized by the following key elements: *Clear expectations and structured guidance* are central to transactional leadership, where commanding officers set defined performance goals and clear standards that help personnel understand their specific roles and responsibilities. This approach enhances motivation by fostering accountability—team members are more likely to stay on track when they know exactly what is expected of them and how their performance will be measured. In parallel, *performance-based rewards* are used as external motivators, offering tangible incentives such as promotions, commendations, or other recognitions to reinforce desired behaviors and outcomes. While this can be effective in driving short-term performance and ensuring task completion, it may also lead to surface-level engagement. When motivation is tied primarily to rewards rather than internal satisfaction or alignment with mission goals, individuals may lack a deeper commitment to the organization's values or long-term objectives. Thus, while transactional leadership can be highly efficient in structured environments like the military, it should be balanced with intrinsic motivators to cultivate sustained dedication and meaningful contribution [1, 103].

A god example of the transactional leadership is the case of "Desert Storm", General H. Norman Schwarzkopf, as Commander of Coalition Forces during the Gulf War in 1991, faced the challenge of uniting a diverse multinational force to counter Iraqi aggression, necessitating a leadership style that ensured discipline, clarity, and effective coordination. He adopted a transactional leadership approach by providing clear, explicit orders so every unit understood its role and responsibilities, recognizing and rewarding achievements to motivate troops, and enforcing strict accountability with immediate corrective actions for deviations or underperformance. As a result, coalition forces operated efficiently and cohesively despite their diverse backgrounds, achieving a rapid and decisive victory over Iraqi forces, with the emphasis on discipline and clear directives contributing to minimal friendly casualties. This case demonstrates that transactional leadership, with its focus on clear expectations, rewards, and accountability, is highly effective in military operations requiring strict discipline and coordination, though it may be less suitable in situations that demand adaptability and innovation [3].

Effective military leadership combines transformational and transactional approaches to optimize both motivation and operational effectiveness. Transformational leadership, exemplified by Admiral Nimitz, builds long-term commitment through inspirational vision, trust-building, and empowerment - essential for morale restoration and innovative thinking. Transactional leadership, as demonstrated by General Schwarzkopf, delivers immediate results through clear expectations, performance-based rewards, and structured accountability systems. The most successful commanders integrate these complementary styles: using transformational techniques to create shared purpose and intrinsic motivation, while applying transactional methods to ensure disciplined execution. This dual approach develops adaptable, high-performing teams that can meet complex challenges, with skilled leaders employing emotional intelligence and communication prowess to balance inspirational messaging with precise operational directives, thereby sustaining both engagement and performance standards.

2. Communication and Emotional Intelligence

Effective communication is fundamental to successful leadership and teamwork, especially in high-stakes environments. A leader's emotional intelligence significantly impacts communication effectiveness, enabling them to recognize, understand, and manage their own emotions while being sensitive to the emotions of others. This skill allows commanding officers to gauge the emotional states of their troops, respond appropriately, and create a supportive atmosphere. Empathy and understanding are not signs of weakness; they are vital traits for leaders who wish to build trust and rapport. Commanding officers must convey objectives, expectations, and feedback in an authoritative yet empathetic manner, as ambiguity and inconsistency can lead to confusion, frustration, and decreased morale. Moreover, effective communication includes active listening, which makes subordinates feel heard and valued, ultimately enhancing their engagement.

2.1 Understanding Emotional Intelligence

Emotional intelligence is built on five essential components: self-awareness, self-regulation, motivation, empathy, and social skills. *Self-awareness* enables individuals to recognize and understand their own emotions, helping them assess how these emotions affect their actions and interactions. This insight promotes honest and reflective communication. *Self-regulation* is the capacity to control emotional impulses, allowing leaders to remain composed and responsive under pressure, which contributes to clearer, more balanced decision-making. *Motivation*, especially when intrinsic, fuels a leader's drive to achieve goals with enthusiasm and persistence, creating a ripple effect of motivation across the team. *Empathy*, or the ability to perceive and understand others' emotions, deepens interpersonal connections and strengthens trust, which is critical for collaboration and morale. It also enables leaders to respond thoughtfully and appropriately to the emotional needs of others. Lastly, strong *social skills* are key to managing relationships effectively—leaders use them to influence others, resolve conflicts, foster teamwork, and communicate persuasively. These five pillars of emotional intelligence collectively enhance a leader's ability to inspire, connect with, and guide others in a meaningful and impactful way [5].

To see how these components come to life in practice, let's explore a real-world case study that illustrates the transformative impact of emotional intelligence on leadership and organizational performance - The U.S. Air Force faced recruitment challenges in the late 1990s and sought to improve the effectiveness of its recruiters. To address this, the Air Force implemented the Emotional Quotient Inventory (EQ-i) to assess recruiters' EI competencies, focusing on areas such as Assertiveness, Empathy, Happiness, and Emotional Self-Awareness. Recruiters who scored higher in these EI domains were found to be significantly more successful in their roles. By incorporating EI assessments into the recruiter selection process, the Air Force nearly tripled its ability to predict recruiter success and achieved annual savings of about $3 million. This success led the Government Accountability Office to recommend that all military branches consider EI-based selection procedures. Beyond recruitment, the Air Force continued to emphasize EI in leadership development, such as through the Air University's Leadership Development Course at Maxwell Air Force Base, which focuses on empathy and interpersonal communication to address toxic leadership and foster a more inclusive culture. The key takeaway is that integrating emotional intelligence into recruitment and leadership development not only improves organizational effectiveness and cost efficiency but also supports diversity and a positive organizational culture [6].

2.2 The Role of Communication in Leadership

Effective communication encompasses not only the transmission of information but also the ability to listen actively and foster a two-way dialogue. Leaders must be adept at articulating their

thoughts clearly while also being receptive to feedback and concerns from their team members. Clear communication helps eliminate misunderstandings and sets accurate expectations, leaders who communicate with clarity and transparency build trust and credibility within their teams, fostering an environment where personnel feel valued and heard. Active listening enhances this dynamic by ensuring leaders not only hear but engage with and understand their team members, demonstrating empathy and respect that boost morale and strengthen relationships. Additionally, constructive feedback, delivered in a supportive and encouraging manner, plays a crucial role in helping individuals grow, build confidence, and improve performance. Conflict resolution is another vital aspect of leadership communication — since disputes are inevitable in any group, leaders with emotional intelligence must address them sensitively and tactfully, using effective communication to mediate disagreements and promote a collaborative, cohesive team environment.

2.3 The Interplay of Communication and Emotional Intelligence

Communication and emotional intelligence are reciprocally linked, with high emotional intelligence boosting communication skills and effective communication nurturing emotional intelligence. Empathetic and authentic leaders build trust, fostering open communication and psychological safety, while also enhancing team collaboration by recognizing emotional dynamics, addressing issues effectively, motivating others, and facilitating cooperation, leading to improved problem-solving, innovation, job satisfaction, and informed decision-making. To leverage these benefits, leaders can employ strategies such as regular self-reflection, empathy training, feedback mechanisms, and mindfulness practices, which promote self-awareness and interpersonal effectiveness, enabling composed and respectful interactions, especially during challenging conversations. Ultimately, integrating emotional intelligence into communication practices is crucial for effective leadership, driving individual, team, and organizational success, and underscoring the importance of honing these skills for navigating the complexities of human interaction in any environment.

3. Leading by Example

One of the most powerful tools in a commanding officer's arsenal is personal example, as soldiers are far more likely to follow leaders who consistently embody the values and standards they espouse, such as integrity, courage, discipline, and commitment. When officers share in the hardships of their troops, participate in drills, and remain visible and involved, they reinforce their credibility and strengthen unit cohesion, while leaders who distance themselves or exploit their rank for privilege quickly lose respect and motivation from subordinates.

Leading by example also means handling failure and adversity with honesty—officers who admit mistakes, take responsibility, and learn from setbacks model resilience and foster a growth mindset within the unit. This principle extends beyond the military; in every corner of society, true leadership stands out not by command but by conduct. "Leading by example" is more than a phrase — it is a principle rooted in action, where leaders model the behaviors, values, and standards they expect from others, inspiring trust, loyalty, and excellence. Inconsistency, such as emphasizing punctuality but arriving late, breeds cynicism, while leaders who are punctual, attentive, and reliable become mirrors for their teams' behavior. By "getting their hands dirty," staying late, or being open to feedback, leaders demonstrate humility and teamwork, motivating employees to go the extra mile. Trust, the foundation of any strong team, is built through consistency between words and actions, and leaders who show accountability and empathy foster psychological safety and high performance. In today's digital age, where remote collaboration and rapid change are the norm, leading by example is even more critical, requiring resilience, clear communication, and emotional intelligence.

Though challenging, as it demands self-awareness and adaptability, leading by example is the foundation of authentic leadership, transcending industry and role, and through action—not instruction—leaders inspire, gain credibility, and build thriving teams.

Captain Florent Groberg's actions in Afghanistan in 2012 exemplify "Leading by Example" in military leadership, showcasing how courage and self-sacrifice can save lives and inspire others. As a U.S. Army officer commanding a personal security detachment, Groberg was responsible for protecting senior U.S. and Afghan officials. On August 8, 2012, while leading a patrol in Kunar Province, he noticed a suspicious individual approaching the formation. Reacting instantly, Groberg moved toward the threat, physically confronting and pushing the individual away from the group. As he and another soldier tackled the suspect, the man detonated a suicide vest, causing a massive explosion. Groberg's decisive and selfless actions absorbed much of the blast, saving many lives, though four Americans were lost. Despite suffering severe injuries, including significant damage to his left leg, Groberg's primary concern remained the safety of his team. His willingness to act without hesitation, placing himself in harm's way, set a powerful example for his unit and reinforced the importance of vigilance, courage, and putting others first. For his valor, Groberg was awarded the Medal of Honor by President Barack Obama in 2015, becoming one of the few living recipients of this highest military decoration for actions in the War on Terror. The outcome of Groberg's leadership was not only the immediate preservation of lives but also a lasting impact on the morale and cohesion of his unit, who witnessed firsthand the profound effect of a leader willing to share the risks of combat. The key takeaway from Captain Groberg's example is that true leadership is demonstrated through action—by confronting danger, prioritizing the welfare of others, and embodying courage and duty, leaders can inspire extraordinary loyalty and performance [7].

4. Recognition and Empowerment

Motivation thrives in environments where achievements are recognized and individuals feel empowered. Commanding officers play a critical role in ensuring that soldiers receive acknowledgment for their efforts, whether through formal commendations or informal praise. In the demanding realm of military leadership, a commanding officer wields many tools — discipline, strategy, and authority among them. Yet, two of the most underappreciated but profoundly transformative tools in a commanding officer's arsenal are recognition and empowerment.

Recognition boosts morale, reinforces desired behaviors, and builds a sense of pride and belonging. It is essential, however, that recognition is perceived as fair and merit-based to avoid fostering resentment. Recognition is more than ceremony or medals — it is the daily acknowledgment of effort, commitment, and growth. When a commanding officer publicly recognizes a soldier's initiative or resilience, it sends a powerful message: **You are seen, and your contribution matters**. This simple act fosters motivation, loyalty, and trust, essential traits for cohesion under pressure. Recognition sustains morale, especially in environments where risks are high and routine can be grueling.

Empowerment involves entrusting subordinates with responsibilities, encouraging initiative, and supporting decision-making at all levels. When soldiers feel that their contributions matter and that they have a degree of control over their work, their motivation increases significantly. Commanding officers who mentor and develop their personnel not only enhance current performance but also build future leaders. It transforms the traditional command hierarchy into a dynamic network of trusted decision-makers. A commanding officer who empowers subordinates encourages them to take ownership, exercise judgment, and innovate in real-time. It creates adaptive leaders at every level — an invaluable asset in today's complex operational landscapes [8].

Together, recognition and empowerment forge a command climate where soldiers are not just followers, but active participants in mission success. This blend of respect and responsibility cultivates a stronger, smarter force — one that is prepared not only to follow orders but to lead when needed.

5. Supporting Well-being and Morale

In the heart of every successful military unit lies more than discipline and tactics — it lies the unseen force of morale and well-being. For a commanding officer, supporting these elements is a strategic act of leadership. It is a quiet power that sustains performance, loyalty, and endurance through adversity. Commanding officers must be attuned to the physical, mental, and emotional needs of their troops. This includes ensuring access to medical care, managing workloads, and promoting rest and recovery.

Mental health, in particular, requires proactive attention. Stigma surrounding psychological issues can prevent soldiers from seeking help. Officers who openly support mental health initiatives and create a culture of openness contribute to overall morale and resilience. When the unit is on a prolonged deployment. The operational tempo is high, conditions are tough, and home feels distant. Here, the commanding officer's ability to support emotional resilience becomes vital. By checking in personally, listening with intent, and fostering camaraderie, the commanding officer does more than lead — he or she sustains.

Well-being initiatives — such as rotating duties, facilitating communication with families, or offering psychological support — signal care and foresight. They remind service members they are not just assets, but valued individuals. Morale, in turn, is lifted not only by victories in the field but by a command climate that recognizes humanity amidst hardship. The well-being of personnel is a fundamental component of sustained motivation. A commanding officer who supports morale and well-being builds more than a team — they build trust, and trust is the bedrock of military success. When soldiers feel seen, heard, and supported, they don't just follow — they give their best [9].

6. Other Case Studies and Examples

Historical and contemporary examples unequivocally demonstrate the profound and far-reaching influence that commanding officers wield over the motivation and ultimate effectiveness of military personnel. A quintessential illustration of this is General Dwight D. Eisenhower's leadership during World War II. His command was characterized by a distinct fusion of strategic foresight and astute emotional intelligence. Eisenhower's impactful presence on the front lines, his personal engagement with his troops, and his inclusive leadership approach were instrumental in unifying a diverse coalition of forces under a singular, overarching mission. His motivational impact transcended mere issuance of orders; he actively fostered a deep-seated belief in the cause and instilled unwavering confidence in eventual victory. Indeed, military effectiveness, defined as the ability to produce favorable military outcomes, is profoundly shaped by such high-quality leadership, and militaries often make demotion and promotion decisions based on this understanding [10].

In the asymmetric environments of Iraq and Afghanistan, the traditional hierarchical structure of command was often less effective than adaptive, decentralized leadership. Junior officers and NCOs frequently operated autonomously, relying on their training, judgment, and interpersonal skills to navigate complex social and combat situations. They were not only tactical leaders but also diplomats, mentors, and mediators—especially when engaging with local populations and coalition partners. These leaders earned trust through consistent actions, respect for cultural norms, and moral clarity. Their ability to lead small units under fire, manage civil-military interactions, and respond

humanely to the needs of civilians set a new standard for modern military leadership. Importantly, their actions often prevented minor incidents from escalating into strategic setbacks. Ultimately, the extraordinary leadership shown by junior ranks during these conflicts underscores the enduring truth: leadership is not confined to rank but proven in action. [11].

When Alan Mulally took over as CEO of Ford in 2006, he inherited a company on the brink of collapse — losing $17 billion annually with deeply demoralized employees and fractured operations. His leadership approach centered on creating the unifying "One Ford" vision, which aligned all global divisions under shared objectives, much like a commanding officer rallying troops around a critical mission. Mulally instituted military-style weekly "Business Plan Review" meetings that mandated radical transparency, where executives had to report progress using standardized color-coded metrics (green/yellow/red), fostering accountability akin to a battlefield debrief. He reinforced positive behaviors through personalized recognition like handwritten "You're awesome!" notes—a civilian parallel to military commendations — while modeling steadfast optimism during the 2008 financial crisis by refusing bankruptcy (unlike competitors GM and Chrysler), demonstrating the same resolve Admiral Nimitz showed after Pearl Harbor. This combination of strategic clarity, visible leadership, and psychological resilience drove remarkable results: Ford returned to profitability within three years without government bailouts, employee engagement surged by 48%, and by 2013, Ford became the world's most profitable automaker. Mulally's success underscores how civilian leaders can apply military-grade leadership—merging unshakable vision with daily engagement — to turn around even the direst organizational crises [12].

Conclusion

In the modern military environment, the importance of motivation cannot be overstated, and commanding officers play a central role in cultivating and sustaining it. This role extends beyond enforcing orders to encompass mentorship, communication, leading by example, and advocating for the well-being of personnel. Leadership style significantly shapes motivation, and a balanced approach between transformational and transactional methods enables commanding officers to inspire long-term commitment while maintaining discipline. Transformational leadership—centered on empathy, vision, and personal growth—drives intrinsic motivation, while transactional leadership ensures order and immediate compliance. Equally essential is emotional intelligence and effective communication; leaders who actively listen, empathize, and communicate clearly foster trust, cohesion, and psychological safety within their units. Moreover, leading by example, especially in challenging conditions, reinforces credibility and cultivates unity. Recognition and empowerment are powerful motivators — when soldiers feel valued and are entrusted with responsibility, their pride and engagement rise, nurturing future leaders. Attention to well-being is not optional but a core leadership duty, addressing physical, mental, and emotional needs to preserve morale and operational effectiveness. Historical and contemporary examples confirm that effective leadership, rooted in compassion and competence, directly drives performance. Ultimately, motivation is not enforced but inspired, and officers who understand this truth will achieve mission success while leaving a meaningful legacy in those they lead.

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THE IMPACT OF MILITARY EXPENDITURES ON FOREIGN DIRECT INVESTMENT INFLOWS: A CASE STUDY OF MOROCCO

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Abstract:

This research explores the intricate connection between military spending and FDI inflows in Morocco. By utilizing a strong theoretical foundation and practical examination, the study investigates whether military expenditures in Morocco create a favourable environment for investment or dissuade foreign investors by shifting resources away from key economic areas. The results point out a complex situation covering multiple areas related to defense spending in relation with the prosperity of the economy as a whole. Also, other dimensions were addressed, namely investors' trust, attractiveness, national security by merging theoretical insights and data from several decades. These findings are crucial for policymakers who want to maximize defense spending efficiency and promote long-term economic growth. By exploring Morocco as a case study, it offers a practical framework for researchers to analyze the balance between national security priorities and sustainable economic development in emerging economies.

Key words: Military spending; FDI; National security; Economic growth; Attractiveness

1. Introduction

The relationship between a country's defense spending and its capacity to attract foreign direct investment (FDI) has recently emerged as a topic of growing interest among economists and policymakers. Defense expenditures, which encompass a nation's outlays on military personnel, equipment, and infrastructure, are frequently regarded as a crucial element in maintaining stability and safeguarding borders. For some countries, these expenditures can enhance security and foster an environment in which investors feel more comfortable committing resources. In other instances, elevated military spending may indicate instability or a prospective depletion of resources that could otherwise be allocated toward economic expansion, thereby deterring investment.

Foreign direct investment (FDI) inflows represent capital investments made by foreign entities into a host country. These inflows are frequently instrumental for economic growth, as they bring not only capital but also technology, expertise, and employment opportunities. Investors typically seek stable environments in which their investments are likely to be protected and to generate returns. Consequently, the perceived stability or volatility within a country has a considerable impact on the direction of FDI flows.

The relationship between defense spending and foreign direct investment (FDI) is complex and multifaceted. On the one hand, reasonable defense expenditures may serve to reassure foreign investors of a stable political environment, thereby reducing the risk of internal conflict or external threats. Such reassurance may render the country more attractive to investors. Conversely, excessive

military spending may be perceived as a warning signal, raising concerns about the country's priorities and economic stability, or diverting funds from critical sectors like education, health, and infrastructure—all of which can also attract FDI.

This study is a preliminary attempt aiming to examine the impact of defense expenditures on foreign direct investment (FDI) inflows, with a particular focus on Morocco as an intriguing case study due to its strategic location and substantial investments in both national security and socio-economic development.

In this framework, the central question is : To what extent do military expenditures affect the inflow of foreign direct investment (FDI) in Morocco?

This paper aims to examine whether Morocco's defense spending stimulates an attractive environment to foreign direct investment (FDI) or if it acts as a deterrent by diverting resources from economic growth initiatives. This analysis may provide insights on balancing defense needs with economic development goals, ultimately fostering a favorable environment for foreign investment.

2. Conceptual framework

This paragraph aims to provide a comprehensive overview of the conceptual framework connecting the core concepts of our study: Foreign Direct Investment (FDI) and defense expenditures.

2.1. Foreign Direct Investments

The International Monetary Fund's Balance of Payments Manual defines FDI as "an investment that is made to acquire a lasting interest in an enterprise operating in an economy other than that of the investor, the investor's purpose being to have an effective voice in the management of the enterprise". The United Nations 1999 World Investment Report (UNCTAD, 1999) defines FDI as "an investment involving a long-term relationship and reflecting a lasting interest and control of a resident entity in one economy (foreign direct investor or parent enterprise) in an enterprise resident in an economy other than that of the foreign direct investor (FDI enterprise, affiliate enterprise or foreign affiliate). The term 'long-term' is used in the last definition in order to distinguish FDI from portfolio investment, the latter characterized by being short-term in nature and involving a high turnover of securities. A simpler definition suggested by Moosa (2002) defines the FDI as the involvement of individuals or entities from one country (the source country) acquiring ownership of assets in another country (the host country) to gain control over the production, distribution, and operations of a business there. According to Hill (2007), FDI is when a company or individual invests in business interests in another country by acquiring foreign assets or establishing operations.

The main similarity among these FDI definitions is the use of the terms 'control' and 'controlling interest', which are crucial in differentiating FDI from portfolio investment, as a portfolio investor does not aim for control or long-term interest. Although there is no consensus, a majority believe that having at least a 10 per cent stake is considered a controlling interest, giving the foreign company the power to influence important project decisions.

FDI can be categorized based on how it is seen by the investor (source country) or the host country. From the investor's point of view, Caves (1971) differentiates between horizontal FDI, vertical FDI, and conglomerate FDI. Horizontal FDI is done to expand horizontally by producing the same or similar goods in another country as in the original country. Therefore, product differentiation plays a crucial role in the market structure of horizontal FDI. In broader terms, horizontal foreign direct investment (FDI) is carried out to maximize specific monopolistic or

oligopolistic advantages, like patents or unique products, especially if domestic expansion would go against anti-trust regulations. On the contrary, vertical FDI involves either exploiting raw materials (backward vertical FDI) or acquiring distribution outlets to be closer to consumers (forward vertical FDI).

From the host country's perspective, foreign direct investment (FDI) can be categorized as (i) FDI that replaces imports; (ii) FDI that boosts exports; and (iii) FDI initiated by the government. FDI aimed at import substitution entails making products in the host country that were previously imported, which means that both imports by the host country and exports by the investing country will decrease. The size of the host country's market, transportation costs, and trade barriers are expected to influence this kind of FDI. On the flip side, foreign direct investment (FDI) that boosts exports is driven by the aim to find fresh inputs like raw materials and intermediary products. This type of foreign direct investment leads to an increase in exports by the host country as it boosts its exports of raw materials and intermediate goods to both the investing country and other countries where the multinational corporation's subsidiaries are situated. Government-led FDI can be prompted by offering incentives to foreign investors to help address a balance of payments deficit.

Foreign Direct Investment can be categorized into two types: expansionary and defensive. (CHEN & KU, 2000) propose that expansionary FDI aims to utilize the specific advantages of a company in the host country. This form of foreign direct investment also helps increase the sales of the investing company both domestically and internationally. However, they propose that protective foreign direct investment looks for inexpensive labor in the destination country in order to lower production expenses.

The majority of foreign direct investment (FDI) is conducted by large multinational corporations (MNCs) that are well-known in most households. Defining what qualifies as a multinational corporation is challenging, and there is no consensus on the terminology for these companies. The literature contains different terms for these companies, such as 'international', 'transnational', or 'global' combined with 'corporations', 'companies' and 'enterprises'. There is no one defining characteristic for a multinational corporation, which is the most important point to consider. For instance, the United Nations (1973) provides twenty-one definitions for MNCs, or by whatever name they are known (UNCTAD actually refers to them as TNCs).

2.2. Defense spending

Defense spending relates to the funds set aside by a government for military and defense activities. These costs include expenses related to keeping the military forces operational, acquiring weapons, conducting research and development, training, and other operational tasks. According to SIPRI in 2023, defense spending encompasses all government expenditures related to current and past military activities, such as retired personnel pensions and arms procurement. Defense budgets are influenced by a nation's geopolitical risks, financial capabilities, and security strategies.

Defense spending is essential for upholding security at both the national and global levels. Sufficient funding in military capabilities may prevent potential threatsand back a country's geopolitical goals. Nonetheless, overspending without specific goals can result in regional arms race, increasing tensions instead of improving security. During the Cold War, the competition in arms between the U.S. and the Soviet Union showed the deterrent and destabilizing impacts of defense spending (Huntington, 1996).

Defense spending includes various stakeholders such as governments, military, private defense contractors, taxpayers, and international organizations. Governments have a crucial role in establishing budgets and defense priorities, ensuring a balance between national security requirements and financial limitations. Military organizations impact how funds are distributed by taking into account operational needs and the necessity for modernization. Defense contractors and arms manufacturers profit from procurement contracts, often advocating for higher expenditures. In the meantime, taxpayers and civil society organizations push for responsibility and openness to guarantee that money is spent effectively and in line with overall national goals.

Global trends in defense spending reflect geopolitical factors and security threats. In 2022, global military spending exceeded $2 trillion as reported by the Stockholm International Peace Research Institute (SIPRI), with the United States, China, and Russia emerging as the top three spenders. Territorial disputes and modernization efforts have led to notable growth in areas such as Asia and the Middle East. On the other hand, certain European nations are increasing their expenditure due to NATO obligations and tensions in Eastern Europe, demonstrating how global alliances and conflicts influence defense spending priorities.

Military expenses have important economic and financial consequences, impacting growth, fiscal stability, and allocation of resources. This subject is covered by a significant theoretical framework, emphasizing the contentious choices between military spending and other essential areas, along with its intricate effects on development and government budgets.

2.3. Literature review

This review synthesizes key theories, empirical findings, and debates surrounding FDI, providing a comprehensive foundation for understanding its dynamics and implications in diverse economic contexts.

2.4. Attractiveness factors of FDI

Foreign direct investment (FDI) plays a crucial role in stimulating economic growth, and its attractiveness is shaped by several theoretical factors that have been extensively studied in economic studies. According to Dunning's (1988) OLI framework, FDI is influenced by firm-specific strengths (ownership), location advantages (location), and the efficiency gains from internalising activities (internalisation). These three aspects provide a complete structure for understanding why firms choose to invest in particular countries.

North (1990) points out that institutional and political stability is a crucial aspect of FDI attractiveness. Reliable regulations and robust legal safeguards for investors can reduce risks and increase confidence. It is also important to emphasise the importance of the quality of infrastructure, including transport networks, energy accessibility and information technology (Asiedu, 2002). Modern infrastructure reduces costs and increases efficiency, which attracts foreign investors to different locations.

Market potential, such as population size and consumer purchasing power, is another key factor according to Markusen (1995). Market-oriented FDI is attracted to economies with promising growth prospects and strong domestic demand. In addition, the presence of specialised skills and labour costs are crucial factors for production-oriented FDI. Porter (1990) emphasises that a country's attractiveness to foreign investors is enhanced by comparative advantages and effective industrial policies.

Finally, both fiscal and financial incentives are crucial in this process. Research by Blomström and Kokko (2003) suggests that the implementation of policies such as tax breaks and financial aid can help to offset inherent disadvantages and encourage increased investment.

However, a stable macroeconomic environment is needed to complement these incentives to ensure their success in promoting sustainable FDI inflows.

2.5. The impact of military spending on FDI inflows

Although the search for the determinants of cross-border capital flows is one of the essential elements of international political economy, the impact of military spending on the attractiveness of FDI is still poorly explored in the literature.

Furthermore, the theoretical literature puts forward a number of hypotheses as to how military spending in the host country might impact on the investment decisions of MNFs. On the one hand, the first hypothesis stipulates that such spending has a positive impact on FDI in the sense that a country's strong military structure sends a signal to foreign investors that their private capital is safe, a form of geo-economic favouritism (Norrlof, 2010).

On the other hand, the second hypothesis argues that military spending has a negative impact on FDI given that an excessive military spending is responsible for a crowding-out effect that discourages FDI because of the non-proportional defense spending to market size which destabilizes monetary aggregates (interest rates, inflation rates, tax rates, etc.) and disrupts the commercial and business climate (Acemoğlu and Robinson, 2012). Moreover, additional spending on defense could cause underinvestment in civilian public services such as education, infrastructure and public health, which are important factors in FDI attractiveness.

2.5.1. Theoretical framework on the positive impact of the military spending on the FDI inflows :

According to the favouritism hypothesis, military power and defense spending send signals to foreign investors about protecting property rights and minimizing risks. First of all, the theoretical literature recognizes the role of military power as a prerequisite for the development of an attractive climate for FDI (Bergsten, 1975; Cohen, 1977; Helleiner and Kirshner, 2007). Viner (1948) argues that since the beginning of the modern Westphalian state system, rulers have equated military power with economic strength. Norrlof (2010) adds that a country's possession of military power capable of defending its borders is a prerequisite for economic, financial and commercial development. As a result, MNFs can interpret military power as a security signal, offering the guarantee of preserving their physical investments and production sites against a foreign threat such as invasion by a foreign entity (Norrlof 2010, Beckley 2011).

Papaioannou (2009) also argues that military power can reduce political risk, which is a key determinant of FDI location, as an effective military structure assures foreign investors that the local political regime has the legitimate monopoly power to exercise enforcement violence within its borders against internal threats such as insurgency. Moreover, it could be said that the presence of a reliable military structure is a sign of a powerful market.

2.5.2. Theoretical framework on the negative impact of the military spending on the FDI inflows (crowding-out):

According to the crowding-out hypothesis, a massive increase in military spending creates macroeconomic distortions, such as higher inflation and/or interest rates, which directly impact MNFs' return on investment (ROI). Moreover, increased defense spending comes at the expense of other government social programs such as public health and schooling. And since human capital is an important determinant of FDI, the deterioration of public health and education can lead to a drop in inward FDI. Also, infrastructure is no exception to the rule: neglecting spending on infrastructure

(physical, telecommunications, logistics, electricity, water, etc.) makes the business climate less attractive to MNFs.

A strong army in the hands of a political regime characterized by weak institutional quality can lead these governments to practice arbitrary powers in an undemocratic way, such as expropriating property held by foreign investors or even nationalizing their production sites. Equally, weak governance of the political system can trigger security dilemmas with other states, increasing the risk of external conflict or even violent confrontation. As a result, foreign investors are reluctant to locate their FDI in such a climate (Jervis 1978).

2.6. Empirical literature:

Despite the existence of hypotheses dealing with the impact of military spending on FDI, empirical analysis is almost non-existent, and only the historical literature has initiated work on this subject. However, the historical literature does not confirm the geo-economic favoritism hypothesis defended by the theoretical literature, according to which it is military power that causes economic development, which in turn attracts FDI, but the direction of causality is reversed insofar as it is economic development that causes military power. As a result, military power does not impact FDI through the intermediary of economic power, which is a correlation, not a causation. The main historical study is by Kennedy (1987), who represents the general consensus of most of the historical literature (Organski 1969; Modelski 1978; Gilpin 1981) working on hegemonic stability and its relationship with economic development.

Drezner and Hite-Rubin (2016) empirically tested the impact of military spending on inward FDI in 92 countries with large economies for the post-Cold War era in 1990 through 2007. The authors concluded that the impact of military spending on FDI inflows is not linear but quadratic, with an inverted U-shaped curve. Moreover, the more military spending increases, the more FDI the country attracts, confirming the hypothesis of geo-economic favouritism for the rest of the world. However, up to a certain level, additional spending has a negative impact on inward FDI, due to the law of diminishing marginal returns, which confirms the crowding-out hypothesis

The authors explained this result by the fact that the military hegemony of a superpower like the USA is considered safe from external attack, and has a strong national rule of law. As a result, foreign investors believe that increasing military spending in a country with a secure external and internal environment no longer generates new information on the level of political risk within it, and hence no longer attracts FDI. On the contrary, FDI can be deterred by excessive military spending with a negative net marginal benefit: beyond the optimal point, any additional military spending generates a marginal cost in the form of macroeconomic distortions greater than the marginal benefit in the form of political security.

Adeyeye et al (2016) investigated the relationship between military spending and FDI in Nigeria over the period 1985-2015 using the error correction model. They concluded that military spending has a positive direct long-term relationship with inward FDI.

Aderemi et al (2018) analyzed the case of Nigeria during the period 1994-2016 using the DOLS method and the Granger causality test. They concluded that there is bidirectional causality between military spending and inward FDI according to the Granger causality test and a negative impact on FDI. The authors explained this result by the fact that defense spending in Nigeria is not effective enough to preserve the country's territorial integrity and defend national borders due to security challenges such as the infiltration and penetration of "Boko Haram" insurgencies, the "Niger Delta Avengers" movement and "Fulani herdsmen" into the country over time. All these

security challenges, combined with the inefficiency of military spending in Nigeria, discourage foreign investors. On the other hand, and as we will discuss in the next section, the results showed that there is a positive impact of spending on internal national security on FDI inflows. This implies that the security challenges discouraging FDI in Nigeria are more external than internal aggression.

Nusrate and Usman (2017) worked on a panel of 60 developing countries, during the period 1990-2013. They concluded that military expenditure (share in GDP), in the absence of armed conflict, has a negative impact on FDI inflows. The presence of armed conflict, on the other hand, attenuates the negative effect of military spending on FDI. In other words, FDI inflows after increased military spending are higher for the country facing armed conflict than for the country not facing armed conflict. They also found that the impact of military spending on FDI is time-lagged.

3. Case analysis

This section will focus on the detailed examination of the case study relevant to this paper. It will provide an in-depth analysis of the specific context, key aspects, and factors involved, offering valuable insights into the subject matter under investigation. By delving into this case study, the discussion aims to bridge theoretical perspectives with practical applications, enhancing the understanding of the central issues explored in this research.

3.1. FDI attractiveness in Morocco

Morocco is seen as an appealing place for foreign direct investment (FDI) because of its political stability, advantageous geographic location, and policies that are favorable to investors. Important factors are its closeness to Europe, ability to reach African markets, and thorough free trade deals with the EU, the US, and other nations. Infrastructure improvements, like the Tanger Med Port and the growing highway system, increase its attractiveness even more. The nation provides tax benefits, designated economic zones, and industry-focused plans to entice overseas investment.

Foreign direct investment (FDI) has steadily increased in Morocco for the last twenty years, thanks to reforms focused on enhancing the business environment. UNCTAD reports state that Morocco is one of the leading African countries in terms of Foreign Direct Investment (FDI), thanks to its diverse economy. Despite a temporary decline due to the COVID-19 pandemic, Morocco's FDI bounced back swiftly, showing resilience, especially in key areas like automotive and renewable energy.

Key sectors are :

Automotive Industry: Morocco has emerged as a regional hub for automotive manufacturing, with investments from global players like Renault and Stellantis. The sector benefits from industrial ecosystems and export-oriented policies.

Renewable Energy: Significant FDI has been channelled into solar and wind energy projects, aligning with Morocco's ambition to source over 50% of its energy from renewables by 2030. The Ouanrzazate Solar Power Station is a flagship example.

Tourism: With its rich cultural heritage and diverse landscapes, Morocco attracts investments in hospitality and tourism infrastructure. This sector remains a pillar of the economy.

Agro-Industry: FDI in agriculture and agri-business is supported by Morocco's Green Morocco Plan, aiming to modernize the sector and enhance export capacity.

Offshoring and Technology: Investments in IT and business process outsourcing (BPO) are growing, with Morocco becoming a competitive destination for digital services due to its skilled workforce and competitive costs.

Morocco's FDI strategy reflects a balance between traditional industries and emerging sectors, ensuring sustainable economic development and regional competitiveness.

3.2. Military expenditures in Morocco

Recently, Morocco has increased its military budget in order to update its military capabilities.

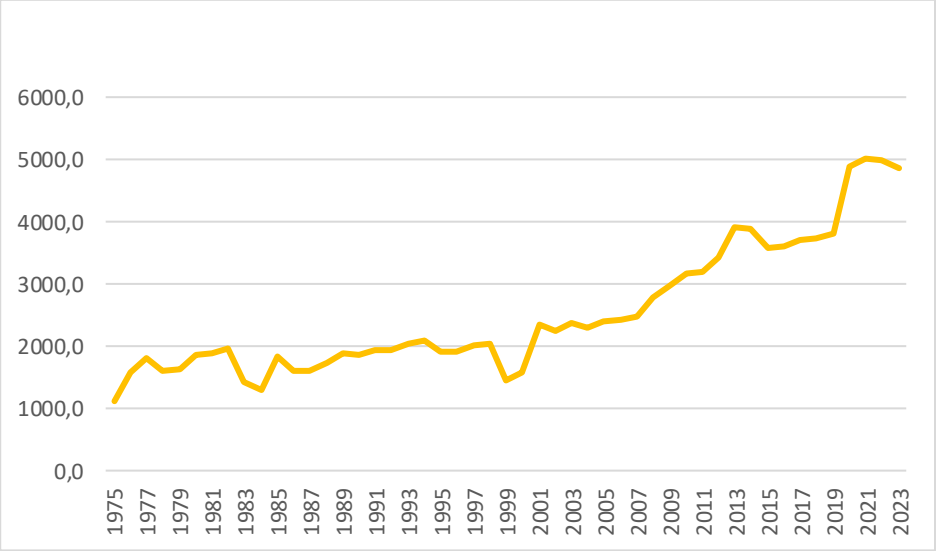

Fig.1 : Evolution of military expenditures in Morocco from 1975 to 2013 is constant USD (2022), Values in mUSD.

This strategy fits in with a worldwide environment marked by fast technological progress and the importance of strong national defense capabilities. Morocco is looking to adhere to global standards and protect its sovereignty by investing in advanced technology like air defense systems, drones, and warships in order to defend against possible threats in today's uncertain geopolitical landscape.

The country's desire to participate in regional security efforts is also fueling the build-up of its military capabilities. Morocco frequently takes part in United Nations peacekeeping missions and works closely with global partners to fight against terrorism and transnational organized crime. These obligations necessitate a military that is well-prepared and well-trained to effectively handle multinational missions.

Ultimately, military spending can also be viewed as a tool for driving economic and technological advancement. Morocco aims to convert military spending into a catalyst for its national economy by encouraging technology transfers, building a domestic defense industry, and creating jobs in related sectors. This tactical strategy merges security necessities with goals for sustainable development, thus enhancing the nation's standing in regional and global arenas.

A SWOT analysis is conducted to showcase the Moroccan army's ability to enhance its status as a modern, capable force and overcome obstacles for sustained growth and preparedness, in relation with the attractiveness factors of FDI.

Table 1 : SWOT analysis

Strengths	**Opportunities**
• Modernization Efforts • Strategic Geographic Location • Regional Influence • Strong Alliances • Strong Leadership and Organization	• Development of a Domestic Defense Industry • Economic Integration with Defense • Cybersecurity and Technological Integration • Technological Advancements • Peacekeeping Leadership
Weaknesses	**Threats**
• Budgetary Constraint • Limited Domestic Defense Industry • Dependence on Foreign Suppliers	• Global Economic Volatility • Climate Change and Natural Disasters • Regional Instability • Cybersecurity Threats

4. Empirical application

description and data sources:

The empirical analysis is based on annual data during the period 1975-2020. The selection of the data is due to the significance of the availability of data on inward foreign direct investment according to the UNCTAD database.

Data on FDI as the dependent variable are provided by UNCTAD, which collects statistics on international capital for the balance of payments. On the other hand, data on defence expenditure as the main explanatory variable are taken from the SIPRI Military Expenditure database. The control variables are taken from the World Bank database.

4.2. Variables description :

- The endogenous variable: foreign direct investment

According to the research hypothesis, we aim to identify the effect of defense expenditure on the location decision of foreign capital. Therefore, FDI is the practical proxy variable usually employed by empirical researchers when answering this kind of research hypothesis related to internationalization and capital movement. Generally, the FDI is defined, according to the International Monetary Fund, as the portion held in the capital of a company that must be greater than 10% to distinguish it from the portfolio investment. In addition to direct equity investments, direct investments also include advances in associates' current accounts and private loans contracted by foreign plants with their parent companies, as well as

reinvested profits. In particular, the variable used for the empirical analysis is the net flow of inward Foreign Direct Investment.

- The key explanatory variable: the defense expenditure

The data for military expenditure are in constant price (2022) in millions of US$. This data concerns the adopted budget, rather than actual expenditure.

- Control variables:

We include the variables as follows: Market size measured by current Gross Domestic Product (GDP) is a proxy for market size. For factor endowment, we use the Revealed Comparative Advantage (RCA) which is based on the Ricardian trade model to indicate the competitiveness of a country that has on other countries. The Revealed Comparative Advantage is the exports share of a product with the total exports of a given country divided by the exports share of the product in the total exports of a zone reference. And finally, we use the weighted average tariffs effectively applied (Tar). In addition, we add the rule of law index as a proxy for institutional quality which reflects "perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence". This Index is ranged between -2.5 for weak rule of law and 2.5 for strong rule of law.

4.3. Empirical model :

To identify the effect of defense expenditure on inward FDI, we formulate the general hypothesis as a logarithmic model to measure the elasticity of FDI to military expenditure as bellow:

$$Log(FDI)_t = \alpha + \beta_1 Log(Def)_t + \beta_2 Log(Mark)_t + \beta_3 Log(GDP\_cap)_t + \beta_4 RCA_t + \beta_5 IQ_t + \beta_6 TAR_t + \varepsilon_t$$

FDI denotes the net flow of inward FDI in millions of current USD, Def denotes the military expenditure by Morocco in millions of USD (constant US 2022), Market denotes the gross domestic product in current USD by millions, GDP_Cap denotes the GDP per capita in current USD, RCA indicates the Revealed Comparative Advantage of Morocco, TAR indicates the weighted average tariffs effectively applied on imports in Morocco, IQ denotes the rule of law index, α denotes the specific fixed effect of each country to control for the omitted factors relatively stable over time and ε is the normally distributed error term.

4.4. Estimation method :

We chose the Robust Least Squares (RLS) estimation method because Ordinary Least Squares (OLS) estimators are much less robust under the existence of observations outside the norm for our regression model. Thus, the outliers would not accurately reflect the underlying statistical relationship between the dependent and explanatory variables. In other words, outliers tend to pull the least squares fit too far in their direction by receiving much more weight than they deserve which causes heteroscedasticity and normality problems. Thus, the estimators of Robust Least Squares reduce the influence of these outliers to provide better data by down-weights the outliers, which makes their residuals larger and easier to identify. In particular, we use the M-estimation technique elaborated by Huber (1973) that addresses dependent variables, i.e. FDI's outliers, where there are large residuals because its values differ noticeably from the regression model norm. Consequently, Robust Weighted least squares provide an alternative to other least squares estimation methods by requiring less restrictive assumptions regarding normality and homoscedasticity using the Welsch function as the best of other weight functions (Yulita et al., 2018).

4.5. Results and discussion

Prior to conducting the estimation, it is essential to provide a comprehensive presentation of the descriptive statistics for the variables under examination. This step serves multiple crucial purposes in our analysis as follows:

Table 1. Descriptive statistic of the variables:

Variables	Mean	Median	Maximum	Minimum	Std. Dev.	Num. of Obs.	Jarque-Bera statistic
FDI	1161.844	485.8454	3561.003	0.550000	1200.582	46	5.341641*
DEF	2055.825	1444.960	5378.367	413.3261	1408.610	49	6.442082**
MARK	5.28×10^{10}	3.93×10^{10}	1.20×10^{11}	8.98×10^{09}	3.65×10^{10}	46	5.203222*
GDP_Cap	1720.463	1406.629	3235.001	502.7565	921.5995	46	4.857987*
RCA	0.914815	0.910000	1.030000	0.820000	0.069136	27	2.034585
IQ	-0.121052	-0.122780	-0.003413	-0.279851	0.065187	22	0.376799
TAR	7.085803	6.307608	13.59181	4.089444	2.560430	32	4.873114*

Note: ***, **, * indicate a significant level at 1%, 5% and 10% respectively.

Table 2 : Descriptive statistic of the variables

Source: Author's.

Table 2 provides a comprehensive overview of the key variables used in our analysis, including their mean values, medians, minimum and maximum values, standard deviations, the number of observations, and the Jarque-Bera statistic. These statistics offer critical insights into the distribution and characteristics of our dataset, particularly for the following key variables.

Foreign Direct Investment (FDI): The average value of FDI is approximately 1,161.84 million USD, with a median of 485.85 million USD. The large disparity between the mean and median suggests the presence of outliers or extreme values in the dataset. The FDI ranges from a minimum of 0.55 million USD to a maximum of 3,561 million USD, indicating a wide variability in the data. The standard deviation of 1,200.58 reflects this high dispersion. The Jarque-Bera statistic is 5.34, which, while not significant at conventional levels, suggests a slight deviation from normality.

Defense Spending (DEF): The mean defense expenditure is 2,055.83 million USD, with a median of 1,444.96 million USD. The difference between these measures indicates the possibility of positively skewed data due to higher values. The values span from a minimum of 413.33 million USD to a maximum of 5,378.37 million USD, with a standard deviation of 1,408.61, reflecting high variability. The Jarque-Bera statistic is 6.44, again pointing to a moderate deviation from normal distribution.

Market Size (MARK): The mean market size is approximately 5.28×1010 USD, with a median of 3.93×1010 USD. The large discrepancy between the mean and median signals the presence of outliers. The range is vast, extending from a minimum of 8.98×1009 USD to a maximum of 1.20×1011 USD, with a standard deviation of 3.65×1010. The Jarque-Bera statistic of 5.20 suggests some non-normality, though it does not strongly depart from normal distribution.

GDP per Capita (GDP_Cap): GDP per capita averages 1,720.46 USD, with a median of 1,406.63 USD. The smaller difference between the mean and median compared to other variables suggests a more symmetric distribution. The range is from 502.76 USD to 3,235 USD, and the standard deviation is 921.60, indicating moderate variability. The Jarque-Bera statistic of 4.86 suggests some deviation from normality, though it is not highly significant.

Revealed Comparative Advantage (RCA): The mean RCA value is 0.915, with a median of 0.910. The small difference between the mean and median, along with the range from 0.820 to 1.030, indicates a relatively symmetric distribution. The standard deviation is 0.069, suggesting low variability. The Jarque-Bera statistic of 2.03 indicates no significant departure from normal distribution.

Institutional Quality (IQ): Institutional quality has a mean of -0.121, with a median of -0.123. The data range from a minimum of -0.280 to a maximum of -0.003, and the standard deviation is 0.065, reflecting low variability. The Jarque-Bera statistic of 0.38 is insignificant, indicating that the data follow a near-normal distribution.

Tariff Rates (TAR): Tariff rates have an average of 7.09%, with a median of 6.31%. The range extends from a minimum of 4.09% to a maximum of 13.59%, with a standard deviation of 2.56%, signifying moderate variability. The Jarque-Bera statistic of 4.87 points to a slight deviation from normal distribution, though not at significant levels.

In summary, the departure from normality, as indicated by the Jarque-Bera statistic, justifies our choice of robust statistical methods. Robust techniques, such as RWLS, offer a more reliable approach to handle non-normality and outliers in our data. By utilizing RWLS, we can ensure that our regression analysis is less influenced by extreme values and provides more accurate estimates of the relationships between variables.

Table 2. The effect of military spending on inward FDI in Morocco:

Variables	**Coefficient**	**Std. Error**	**z-Statistic**	**P-value**
C	127.2217	5.846614	21.75990	0.0000
LOG(DEF)	1.563409	0.133421	11.71787	0.0000
LOG(MARK)	-7.480372	0.350282	-21.35528	0.0000
LOG(GDP_Cap)	7.236969	0.381168	18.98631	0.0000
RCA	1.630346	0.477559	3.413916	0.0006
IQ	-1.417326	0.149474	-9.482083	0.0000
TAR	-0.429735	0.013351	-32.18794	0.0000
Adjusted Rw^2	0.893620			
Rn statistic	8386.000 (p-value=0.0000)			

Note: Estimation method: RWLS with M-estimate. The covariance type for the estimate is the Huber type with Welsch function for the weight. Scale used is Huber. The dependent variable is Log(FDI). The variables RCA, IQ and TAR are excluded from the logarithmic transformation due to their non-metric nature of their data (score and percentage).

Table 3. The effect of military spending on inward FDI in Morocco

Source: authors' estimates

Table 3 provides a detailed analysis of the determinants of inward Foreign Direct Investment (FDI) in Morocco, focusing on the impact of military spending (DEF) alongside other economic and institutional factors. The regression was estimated using the robust weighted least squares (RWLS) method with the Welsch function for weighting, ensuring robustness against outliers and heteroscedasticity.

The constant term (C) is statistically significant at the 1% level, with a coefficient of 127.22, indicating a substantial baseline level of inward FDI in the absence of other influencing variables. Military spending (LOG(DEF)) exhibits a positive and significant coefficient of 1.56, suggesting that a 1% increase in military spending is associated with a 1.56% increase in FDI. This positive relationship underscores the potential role of defense expenditures in enhancing investor confidence, potentially due to increased security or strategic economic implications.

Market size (LOG(MARK)) shows a negative and highly significant coefficient of -7.48, indicating that a 1% increase in market size correlates with a 7.48% reduction in FDI. This counterintuitive result may point to structural inefficiencies or market conditions that discourage investment despite the size of the market. Conversely, GDP per capita (LOG(GDP_Cap)) has a strong positive association with inward FDI, with a coefficient of 7.24. This finding emphasizes the critical role of economic prosperity in attracting foreign investment, as higher income levels likely signal greater purchasing power and market stability.

Revealed comparative advantage (RCA) also positively influences FDI, with a coefficient of 1.63, statistically significant at the 1% level. This highlights that Morocco's competitive edge in specific sectors can attract foreign investors. On the other hand, institutional quality (IQ) presents a negative and significant coefficient of -1.42, suggesting that improvements in institutional quality may unexpectedly deter FDI. This result could reflect specific institutional or governance dynamics in Morocco that require further exploration.

Tariff rates (TAR) exhibit a negative and statistically significant coefficient of -0.43, indicating that higher tariffs are associated with reduced FDI inflows. A 1 percentage point increase in tariffs leads to a 0.43% decrease in FDI, reinforcing the importance of trade openness in attracting foreign investment.

The model's performance is strong, with an adjusted weighted R-squared value of 0.89, meaning that 89% of the variation in inward FDI is explained by the included variables. The Rn statistic (8386.00, p-value = 0.0000) confirms the overall significance of the model at the 1% level, further validating the robustness of the findings.

Conclusions

This study examines in detail the relationship between military spending and foreign direct investment (FDI) in Morocco as a specific example. The results suggest that defence spending can act as both a facilitator and an inhibitor of foreign investment. Moderate investment in defence has a positive effect by increasing national stability, which is important for attracting FDI. These investments indicate a safe environment for international investors and reinforce Morocco's strategic position as a hub for African and European markets. In addition, industries such as automotive and sustainable energy show how FDI can be used to accelerate economic development.

But the research also points to potential dangers. An overabundance of defence spending can lead to mismanagement of resources, jeopardising investment in key areas such as education and health, which are crucial to sustaining investor engagement. The study highlights the importance of balanced budgeting to minimise the negative economic impact of the crowding-out effect. In addition, while Morocco's geographical and political strengths remain, continued improvements in governance and transparency within institutions are critical to increasing FDI inflows.

Finally, the research confirms positive impact of the military spending on the inflows of FDI, and supports a balanced strategy for defence spending that emphasises stability while promoting economic growth. It is important for policymakers to ensure that military spending is consistent with overall development objectives and that FDI is not only continuous but also targeted at sectors with

the potential for sustainable economic growth. By maintaining this balance, Morocco can increase its competitiveness and attractiveness to global investors.

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THE IMPACT OF THE TRANSITION FROM THE VUCA MODEL TO THE BANI MODEL ON MILITARY ORGANIZATION MANAGEMENT

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Abstract:
The article presents a summary of an exploratory study that highlights two modern concepts of contemporary management – VUCA and BANI, tailored to the field of security and defence, and in particular to the field of military organization management. The aim is to determine the main areas impacted in the military organization in the context of this new managerial paradigm – BANI, an analysis that needs to be corroborated with other current concepts in military science theory and practice. Subsequently, the aim is to identify lines of effort that need to be operationalized so that the transition has a minimized negative impact, adapted to the general security context. The role of resilience and education in such frameworks of change is emphasized.

Key words: defence: management; BANI model; resilience; VUCA

1. Introduction

In recent decades, the military organizational environment has been defined by the acronym VUCA (Volatility, Uncertainty, Complexity, Ambiguity) to describe unstable and unpredictable operational environments. This model, which has its roots in the work of Bennis and Nanus (1985) and has been popularized mainly in management literature, has also been adopted by military leaders at all levels to explain the post-Cold War transition [1]. The importance of preparing for VUCA conditions is confirmed in military practice: "Military leaders must be able to do this under volatile, uncertain, complex, and ambiguous (VUCA) conditions" [2].

This paradigm has led to the development of training models focused on critical thinking, creativity, and organizational resilience, but recent changes (pandemic, supply chain crises, hybrid warfare, and cyber threats) show the conceptual limitations of VUCA in capturing certain types of fragility and psychological reactions in complex systems [2], [3], in other words, "VUCA changes the rules during the game, making it difficult to react immediately due to frequent and dynamic changes" [4]. In this context, experts have introduced the BANI (Brittle, Anxious, Nonlinear, Incomprehensible) model as a new analytical framework, considering that we live "in a fragile, anxious, nonlinear, and incomprehensible world, aspects that are visibly reflected in military resource management and strategic decision-making" [5], [6]. The BANI concept is not just a semantic evolution but responds to the need to address the new organizational reality: "The BANI model describes a new world in which the old values and rules no longer apply" [7]. Thus, the impact is not only theoretical but also operational and strategic: „Military leadership in a VUCA world and BANI scenario is characterized by a complex combination of competencies in a personal,

relational and organizational level. Among them the capacity to think out of the box, to be creative, innovative, intuitive, resilient, flexible and adaptative" [3].

This raises the question of the type of military education required to pursue specialized professions in the field of security and defence, particularly with regard to the initial training of officers. What is the best option? A more general framework that allows for a better understanding of the current operational environment (and implicitly uses adaptability and flexibility in identifying appropriate solutions) or a strictly specialized education, oriented towards the acquisition of a limited field of conceptual frameworks but rich in the internalization of standard operating procedures? The basis for the discussion should also be built on an understanding of the relationship between the military dimension of security and non-military dimensions.

For military organizations, the transition from VUCA to BANI is not just a change in terminology, but an adjustment of analytical tools, training, and decision-making architecture. Recent literature indicates that military leadership must integrate organizational learning competencies, civil-military interoperability, and digital skills to cope with hybrid and non-linear environments; at the same time, studies show that traditional prediction and planning models do not sufficiently cover the psychological reactions of personnel or the infrastructural fragilities revealed in crises [2], [3. Adopting the BANI model could enable the development of policies and training that target not only the ability to adapt to change, but also the reduction of fragility, the management of organizational anxiety, and the development of rapid sense-making mechanisms in the face of non-linear phenomena.

2. Theoretical foundations of VUCA and BANI

As mentioned earlier, the VUCA model, built on the pillars of volatility, uncertainty, complexity, and ambiguity, emerged in the US military to "describe a more complex multilateral world perceived as resulting from the end of the Cold War" [8]. For the military system as a whole, the adoption of this analytical framework had a dual role: on the one hand, "VUCA provides a lens through which leaders can diagnose the environment and determine the best course of action" [9], and on the other hand, it served as a platform for analysis for a wide range of strategic contexts, from military operations to major organizational changes.

From this perspective, we believe that bibliometric analysis can provide a much more comprehensive qualitative picture of the VUCA concept and its implications for organizational management, regardless of its specifics.

The VUCA concept, first used by the US military to analyse armed combat environments, was first mentioned in a Web of Science indexed scientific publication in 2008, for improving fleet management in railway traction [10]. Since 2008, this conceptual model has been addressed in 864 scientific publications, used to diagnose the environment in which organizations operate in several fields of activity.

The use of the VUCA concept in the security environment has generated 28 scientific articles on Web of Science, published between 2008 and 2025. These publications have been compiled into a database, which has been analysed to highlight trends and the impact of research in the field. Figure 1 contains a diagram of key terms that create links between them, integrating 126 items out of a total of 200 keywords.

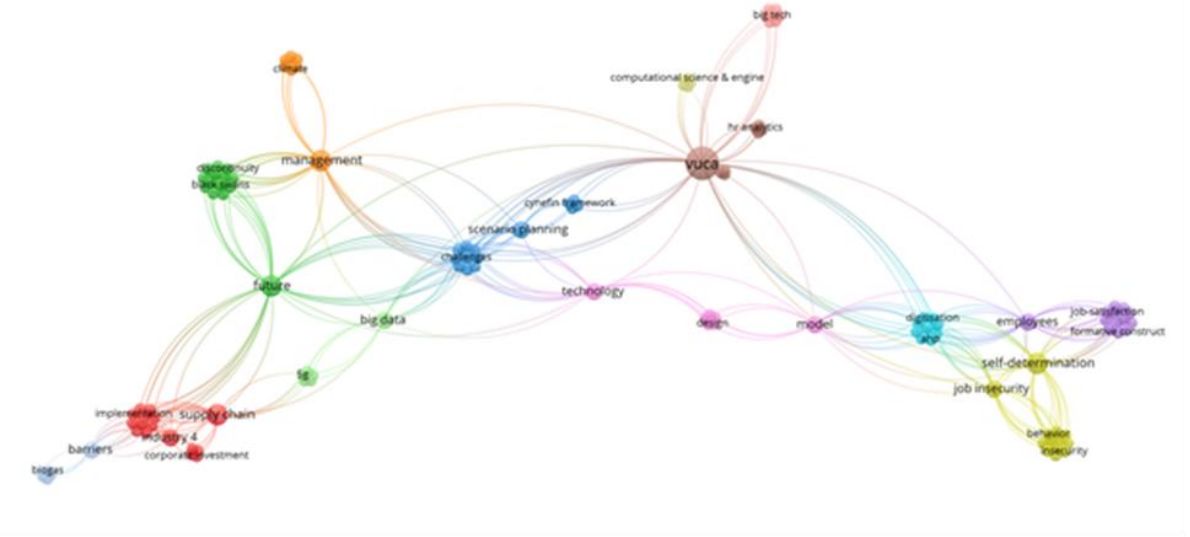

Figure no. 1. Keyword diagram

The main keywords grouped the terms into 13 clusters. Table 1 contains 14 items ranked according to the strength of the links they create and with the most occurrences in the text. The difference between the 14 items in Table 1 and the 126 in the diagram are terms that appear only once in the text and create fewer links with other terms. Both the figure and the table show that, with the adoption of the VUCA model in organizational management, this analytical framework has been used in studies and research aimed at identifying how leaders and organizations can keep employees engaged, motivated, and flexible.

The link between VUCA and technology, resulting from the bibliometric analysis, may have several implications: on the one hand, technology generates uncertainty and complexity, creating insecurity in the workplace; on the other hand, technology can be a response to VUCA, making it easier to test scenarios and increasing predictability in the planning stages.

Crt. No.	Keywords	Appearances in text	Total link strength
1.	VUCA	7	51
2.	future	3	42
3.	self-determination	3	38
4.	management	3	35
5.	employees	2	26
6.	job insecurity	2	25
7.	supply chain	3	25
8.	big data	2	20
9.	technology	2	20
10.	barriers	2	19
11.	Industry 4	2	19
12.	Model	2	19
13.	scenario planning	2	19
14.	knowledge management	2	15

Table no. 1. Keywords that create the strongest links in the text

In terms of mapping the specialized literature, Figures 2 and 3 highlight the most cited countries, as well as the most cited scientific publications. It can be seen that the most cited scientific work is affiliated with Finland, although in terms of number of publications, the top five places are occupied by India (7), Romania (6), China (4), the US (3), Germany (2), followed by Finland with one publication. The article published by Finnish authors draws attention to the complex problem that a deficient energy system can trigger, given the increased interconnection of states due to digitalisation and globalisation [16].

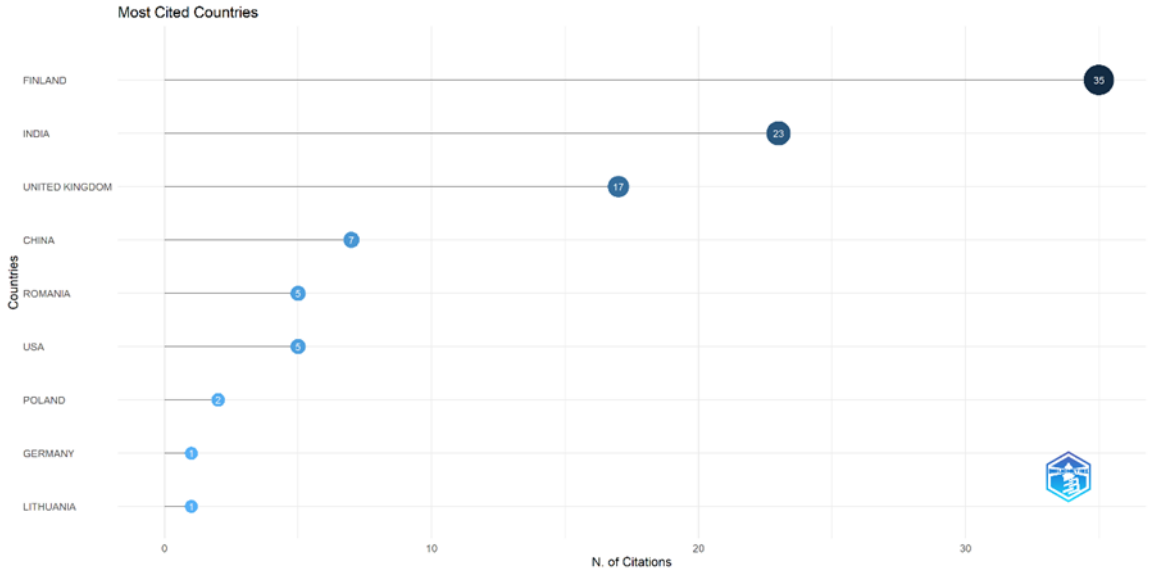

Figure no. 2. Most frequently cited countries

As for Romanian authors, the most cited scientific publication outlined a leadership model whose application gives leaders the ability to be flexible and agile in any VUCA environment. The article also identified strategies used by leaders to cope with the most difficult decision-making contexts they may face in the future [11].

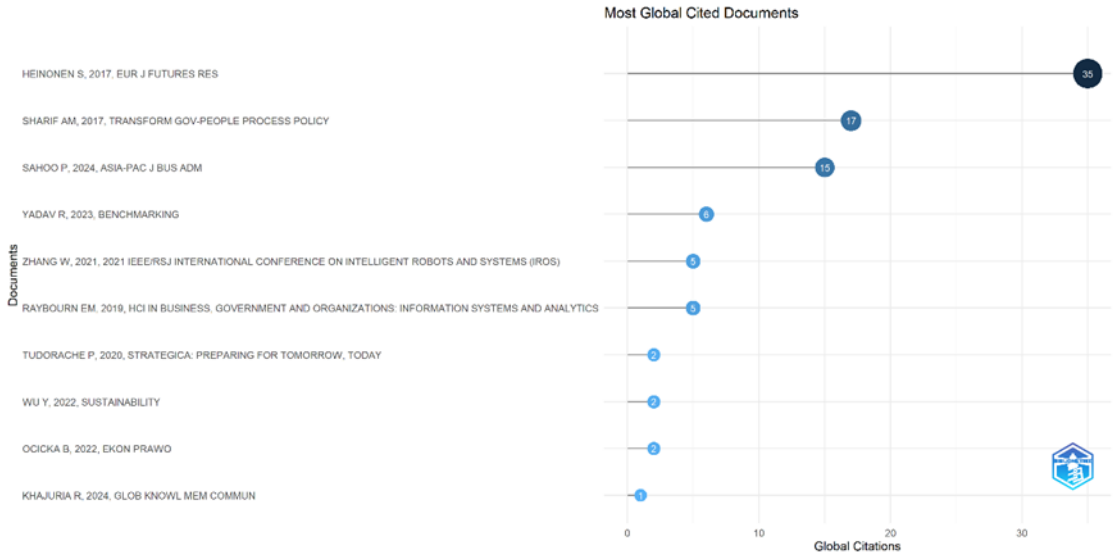

Figure no. 3. Most cited publications

Figure 3, which highlights the most cited scientific documents, complements Figure 2 with the most relevant works in the field. The second most cited scientific article is affiliated with the United Kingdom, which stands out with a single publication in the field, cited in 17 other works. Using the VUCA perspective to frame food security challenges, the authors emphasize the need for governments to be prepared to deal with a wider variety of external forces, risks, opportunities, and threats in order to mitigate food insecurity [12].

However, the dynamics of recent years—advances in technology, accelerated globalization, hybrid warfare, and overlapping crises—have highlighted the limitations of the VUCA framework. The introduction and conceptualisation of the BANI (Brittle, Anxious, Nonlinear, Incomprehensible) model, according to Jamais Cascio, reflects a shift from the unpredictable to the inexplicable, from uncertainty to collective anxiety: "A VUCA world is one where volatility, uncertainty, complexity, and ambiguity are ever-present. But beyond VUCA, there's a world that's brittle, anxious, nonlinear, and incomprehensible: BANI" [5]. Moreover, „the BANI framework highlights the need for future studies to adapt to evolving global dynamics, providing a lens to better understand and respond to the unpredictable nature of our contemporary world" [5].

Recent bibliography mentions that, although literature on the BANI model is emerging in academia, its applications have begun to be tested in organizational management, engineering, education, and sustainable projects [13], [14].

For example, between 2008 and 2025, the Web of Science database indexed nine documents that integrate this model into their analyses. The applicability of the model was tested in higher education in a study that highlights the changing requirements of the modern labour market, particularly in the transition from a VUCA state to a BANI state, highlighting the increased turbulence and unpredictability of the working environment and the emphasis on soft skills [14]. The model has also been mentioned in studies on construction projects or urban regeneration. The transformative potential of AI in facilitating sustainable practices and achieving long-term success in the BANI environment has been demonstrated [13]. Based on the Web of Science database, there are no published scientific articles analysing security in the BANI environment, which qualifies the topic as emerging and an opportunity for research.

The practical importance for military organizations stems from the fact that the BANI model addresses not only uncertainty (as in VUCA), but also the fragility of systems ("brittle"), collective anxiety ("anxious"), the lack of predictable causal relationships ("nonlinear"), and the information overload of leaders ("incomprehensible"). As Schlegelmilch notes, "The BANI model describes a new world in which the old values and rules no longer apply. In the VUCA concept, everything is volatile, uncertain, complex, and ambivalent" [7]. Therefore, the military organization must reevaluate both its prediction tools and the development of resilient and adaptive leadership skills in the context of multiple and difficult shocks.

3. The applicability of the BANI model in the field of military organization management

As mentioned earlier, the BANI model is a response to the limitations highlighted by the old VUCA model, addressing the new realities faced by modern military organizations. Operational situations, the geopolitical context, the proliferation of technology, and changes in the information paradigm have led to the emergence of an environment that authors are beginning to describe as „brittle, anxious, nonlinear and incomprehensible" [15].

In the following, we will attempt to illustrate how the elements of the BANI model can be applied to the specific managerial processes of the military organization.

1. Brittle

Contemporary military organizations are increasingly vulnerable due to the fragility of their components. Recent experiences have shown that systems considered robust, such as military systems, can quickly collapse under the pressure of severe shocks, such as hybrid attacks, cyber attacks, or unforeseen logistical disruptions. Jamais Cascio emphasized that "brittleness is not just about volatility anymore... it is about a sudden and unforeseen shock to or even the destruction of a seemingly stable system" [15]. Therefore, the "brittle" component requires military leaders to identify critical points, periodically test resilience, eliminate redundancies at all levels of action and in all incorporated systems and subsystems, while developing rapid response scenarios to all internal or external stimuli to the military organization. Addressing this fragility becomes a priority with the emergence of the BANI context.

2. Anxious

In the military environment, anxiety stems both from strategic uncertainty and from the constant emotional pressure on personnel involved in complex or high-risk operations. Operational stress, fear of systemic failure, or difficulty maintaining cohesion in uncertain conditions can quickly undermine morale, cohesion, motivation, and decision-making efficiency, with immediate effects on organizational performance. Schlegelmilch notes that "anxiety... can also be triggered by misinformation and fake news spread online" [7], emphasizing the need for empathetic leadership and psychological support. Therefore, military organization management must include robust policies for psychological support, transparent communication, and the development of a resilient and empathetic organizational climate.

3. Nonlinear

Nonlinearity implies the difficulty of predicting and managing the effects of actions and decisions, as seemingly minor phenomena can produce major changes, and cause-and-effect relationships sometimes become unpredictable. Nonlinear events in the military can bypass traditional risk management, requiring systemic approaches and simulation-based planning [3]. For military organizations, training must include multiple scenarios, rapid responses to unforeseen crises, and the development of organizational intelligence. Rapid paradigm shifts—such as accelerated digitization—deepen the nonlinear nature of the security environment, so that the decision-making process specific to the military organization and reactions in such situations require the use of modern analytical tools, supported by advanced technology and the continuous development of organizational intelligence.

4. Incomprehensible

Incomprehensibility refers to the complexity of situations in which leaders cannot logically and completely anticipate all the variables or risks of an operational context. Cascio emphasizes that "incomprehensibility leaves leaders struggling to make sense of chaos" [15], highlighting the need for adaptability, rapid learning, and the development of skills for interpreting weak signals. In military organizations, this involves promoting an organizational climate open to reconfiguration, rapid decision-making in conditions of risk and uncertainty, and the formation of a culture of tolerance for ambiguity.

Each component of the BANI model puts pressure on the military organization in general, and on military leaders in particular, to develop specific adaptive tools, policies, and behaviours, going beyond classic approaches based solely on robustness and rigorous planning. Leveraging the results of empirical research and integrating the results and tools derived from the bibliometric

analysis proposed in this study can support the construction of a military management doctrine appropriate to the new reality, contributing to organizational resilience, clarity, and flexibility and, last but not least, validating the usefulness of this model as a tool for reflection and action for modern strategic management.

3. Conclusion

The article demonstrates that the transition from the VUCA model to the BANI model marks a paradigm shift for military organization management. While VUCA allowed military leaders to identify, anticipate, and manage the volatility, uncertainty, complexity, and ambiguity of the operational environment, the current global security context reveals new types of risks: the fragility of critical infrastructures, collective and individual anxiety, the non-linearity of processes, and the increasing difficulty of building explanatory models relevant to decision-making.

Bibliometric analysis and recent studies show that the VUCA model has been widely adopted by the specialist literature, but the experience of recent crises (pandemics, hybrid warfare, disruptions to logistics chains, cyber crises) reveals its limitations in capturing the real vulnerabilities of military systems and psychological reactions in unpredictable situations. The BANI model allows for a superior conceptualization of these emerging risks, focusing attention on preventing systemic collapse and developing adaptive organizational and decision-making mechanisms. The application of the four BANI dimensions reveals the need to recalibrate managerial priorities:

- *„Brittle"*: focus on auditing technical, logistical, and social vulnerabilities, redundancy, and resilience testing;
- *„Anxious"*: implementation of psychological support policies, transparent communication, mentoring, and empathetic leadership;
- *„Nonlinear"*: developing organizational capacity for rapid response, multi-scenario simulation, and adaptive training;
- *„Incomprehensible"*: embracing adaptive leadership, rapidly reconfiguring plans, and promoting an organizational culture of tolerance for ambiguity and uncertainty.

We believe that modern military management needs analytical and operational tools that go beyond classic VUCA approaches. Integrating the BANI model into practice will allow not only anticipation, but also prevention of collapse under the pressure of crises with major impact. The use of empirical research and the transfer of best practices from the international environment support the consolidation of an agile, resilient military management doctrine that is relevant for the 21st century. By accepting resilience as a new doctrinal requirement of modern warfare capabilities, affirmed and explicitly stated in concrete terms, rather than merely understood and accepted implicitly, the systemic, technical, and operational orientation of military organization management (at all levels of management) towards the BANI paradigm becomes a sine qua non condition for the timely transformation of defence, as a specialized structure of society but also as complex organizational processes, in the new complicated conditions of the functioning of society as a whole. One can advance the idea of the emergence of new functions such as CRO (chief resilience officer), similar to recent developments in business organizations. The expected impact, in our opinion, given the particularities of the BANI paradigm, is therefore primarily at the level of human resources,

followed by structural and functional changes at the level of logistical support and communications systems.

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EXPLORATORY RESEARCH ON NATO'S HUMANITARIAN DIPLOMACY

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Abstract:
NATO has a growing humanitarian role at the international area especially since the beginning of 2000s. Albeit being a military alliance, NATO's values and strategic interests, as well as its capabilities and tools for disaster response have been transformed over time. Owing to providing disaster-aid and humanitarian-relief in an efficient and timely manner, its humanitarian diplomacy has become a successful case study for relief organizations. Accordingly, this article aims to examine and reveal NATO's humanitarian diplomacy based on its major relief operations. It is concluded that This study concludes that it is necessary to institutionalize a multi-dimensional diplomacy approach based on cultural sensitivity and to develop strategic foresight capabilities in the era of polycrisis.
Key words: Disaster Management; Humanitarian Aid; Humanitarian Diplomacy; NATO.

1.Introduction

In modern world, which is negatively affected by polycrisis as a result of protracted crises, responding to these complex emergencies and providing access to humanitarian aid has become one of the priority issues on the global security agenda. Protracted crises, defined as situations in which a significant portion of the population faces a high risk of death, illness, and livelihood disruption for more than five years. These types of risks pose an increasing challenge to governments and international organizations, as well as humanitarian and development actors. Political unrest has escalated into protracted crises in many countries, leaving them characterized by fragility, conflict, and violence.

The spillover effects of these crises in surrounding countries have led to an influx of refugees, particularly into urban areas. According to the United Nations, 22 states and more than 160 million people are facing protracted crises that pose a significant security risk for both national and international security [1]. Therefore, NATO's both disaster-aid and humanitarian-relief capabilities have significantly improved during major disasters. Accordingly, this study aims to examine and reveal NATO's humanitarian diplomacy based on its major relief operations in recent years.

2.The New World Order: An Era of Polycrisis

The 21st century is characterized by a global reality shaped by climate change, pandemics, mass migration, disinformation, economic fluctuations, and regional conflicts. These issues reveal the complex nature of crises, which interact with each other, feed on common triggers, and produce multilayered outcomes. This situation, conceptualized in literature as polycrisis, refers to a

phenomenon in which multiple types of crises occur simultaneously, and these crises, in turn, trigger each other, compounding the complexities of the situation [2]. Therefore, polycrisis is considered as threats that include asymmetric and hybrid security risks and whose scope is constantly expanding.

This period, which marks an era of polycrisis, requires states to reexamine their foreign policy tools and diplomatic strategies. The inadequacy of traditional diplomacy, military deterrence, and hard power practices, including economic sanctions, in managing comprehensive and high-impact threats, further enhances the importance of soft power elements [3]. The systemic vulnerabilities inherent in multiple crises increase the complexity of the global order and lead to the interconnected progression of crises. In recent years, threats have gained global dimensions and amplified through a domino effect. Economic fluctuations, environmental destruction, social inequality, and technological transformation, while seemingly independent, are variables that form an intertwined network of interactions. The health crisis of the COVID-19 pandemic has triggered multiple crises, along with economic contractions, supply chain disruptions, psychological problems, and educational disruptions [4]. Consequently, social protests have become widespread and political instability has emerged.

3.Humanitarian (Aid) Diplomacy amidst Polycrisis

Historically, humanitarian aid has been conducted under extremely insecure and unstable political conditions to provide access, assistance, and protection for civilians. Humanitarian aid diplomacy or humanitarian diplomacy emerged as a concept in the early 2000s. It persuades decision-makers and leaders to always act in the best interests of vulnerable people and under all circumstances, with full respect for fundamental humanitarian principles [5].

Humanitarian diplomacy is defined as the set of activities undertaken by various actors—governments, (para)military organizations, or individuals—to intervene or insist on intervention in a context where humanity is at risk [6]. Improving access to humanitarian assistance in conflict and complex emergencies has always been a priority for policymakers and humanitarian actors. The traditional scope of humanitarian diplomacy extends from maintaining the presence of humanitarian organizations to reaching civilian populations in need. It includes monitoring aid programs, promoting respect for international law, and advocating in support of broader humanitarian goals [7]. There are a growing political consensus and commitment to "leaving no one behind" in the 2030 Agenda, and humanitarian diplomacy is seen as a tool for reaching the most vulnerable.

On the other hand, disaster diplomacy focuses on why and how disaster-related activities affect conflict and peace processes, particularly in terms of disaster risk and disaster response outcomes, and whether a causal chain can be established [8,9]. The scope and framework of humanitarian diplomacy is more limited than disaster diplomacy. The key difference between disaster diplomacy and humanitarian diplomacy is the involvement of local actors in the process and their reconciliation when necessary.

In order to emphasize effective data management strategies in the operational arena and minimize potential losses in the event of large-scale emergencies and disasters, various international response organizations have been established, enabling more efficient response processes. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA), established in 1991 under the auspices of the United Nations (UN), is a substantial example of the effectiveness of international cooperation in both humanitarian coordination and response processes [10].

4.NATO's Increasing Role in Humanitarian Diplomacy

Albeit being a military alliance, NATO's involvement in humanitarian operations dates to 1953. A disaster assistance framework based on the capabilities for protecting civilians in times of conflicts, as well as protecting them during natural or man-made disasters was developed [7]. In the same year, NATO carried out humanitarian operations during storm floods in Belgium and Netherlands. The procedures for disaster coordination were established by 1958. In 1976, NATO dispatched relief teams for the earthquake in Italy.

It is noteworthy to mention that after the 2000s, NATO responded to three major disasters with the collective use of military capabilities: Hurricane Katrina in 2005, Kashmir Earthquake in 2005, and monsoon floods in Pakistan in 2010. Especially Kashmir Earthquake becomes exemplary case study since the response process is based on a two-stage Alliance response: air-bridge (during which almost 3,500 tons of relief supplies were carried out with 168 NATO flights), and the deployment of Response Force. For the first time, NATO's relief flights noted down as the largest and single contribution in terms of the airlift relief effort [11].

NATO's increasing role in humanitarian relief operations has become visible during the COVID-19 pandemic. In response to the pandemic, member nations built 100 field hospitals with more than 25,000 treatment beds while more than 350 flights were transporting medical personnel. Almost 1,500 metric tones of equipment and medical supplies were dispatched to members including Romania, Hungary, the Netherlands, and Bulgaria [12].

In accordance with the changing security environment, NATO's capabilities have transformed as well. Science for Peace and Security program was developed in 2006 to address emerging security challenges such as environmental security, energy security, and water management. Due to rapidly changing climate and climate associated security risks, NATO adopted Climate Change and Security Action Plan to fight against climate crisis associated migration and the humanitarian consequences [13]. In addition, NATO Centre of Excellence for Climate Change and Security was established in 2023 and accredited in 2024.

5.Conclusion

The crises of modern times are being evaluated within a network of multiple interconnected crises shaped by systemic vulnerabilities, fundamentally transforming the functioning of global governance mechanisms. In the face of these crises, which cannot be managed through technical or military means, diplomacy practices shaped by cultural narratives, historical memory, and established norms have become essential.

Military intervention in disasters is a common occurrence worldwide, particularly when local and civilian capacity is exceeded. In the acute phase of a disaster, interventions can range from search and rescue and debris removal to route clearing, establishing field hospitals, water treatment and supply, and ensuring the safety of response teams. For instance, as part of Operation Hestia, the Canadian Army deployed a team of more than 2,000 army, navy, and air force personnel to respond to the earthquake in Haiti on January 12, 2010. This team performed a variety of tasks, including search and rescue, delivering large quantities of emergency medical supplies, food, water, tents, tarpaulins, water treatment units, and the establishment of field hospitals [14].

On the other hand, increasing the military's response to disasters is not as simple as it seems. As noted by some scholars [15], increased military involvement can be perceived by civilians as a threat to civil liberties. Furthermore, international intervention can lead to various problems related to cultural differences [16].

Herein, NATO's transformation of capabilities presents a unique example for humanitarian aid. Albeit its being a military alliance, NATO's capabilities transformed and expanded over time to address emerging security challenges such as sea level rise, extreme weather conditions, protracted crises, depletion of natural resources, flood risks, geological hazards and pollution, as well as climate-related migration.

The Alliance seems determined to actively engage in coordinating civil emergency response and coordinating civil preparedness. While the establishment of Euro-Atlantic Disaster Response Coordination Centre accelerates the allied efforts, this study concludes that in the era of polycrisis, it is necessary to institutionalize a multi-dimensional diplomacy approach based on cultural sensitivity and to develop strategic foresight capabilities. In this context, NATO's humanitarian diplomacy capabilities need to be strengthened especially based on crisis prevention and management.

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EFFECTIVENESS OF THE DEFENSE RESOURCES MANAGEMENT SYSTEM

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Can military effectiveness be enhanced through? Mission Command – lessons learned from recent conflicts

Introduction

The ability to comprehend and influence the environment during competitive interactions and deterrence phases, without resorting to armed conflict, is crucial for multiple reasons. Firstly, it minimizes the risk to military forces by avoiding direct confrontations. Secondly, understanding the nuances of the environment allows for the strategic allocation of limited resources, ensuring they are used where most effective. This strategic insight also enables a nation or organization to wield influence more effectively and gain informational advantages. By shaping perceptions and controlling narratives, entities can outmanoeuvre opponents, making informed decisions that leverage geopolitical dynamics to their benefit, all while preserving peace and stability.

This is the case of the recent military conflicts and tensions worldwide that have varied in intensity and scope, touching on various geopolitical issues and regions. On the other hand, the Mission Command concept, known for promoting decentralized decision-making and the autonomy of leaders, has deep historical roots in military practices, evolving through the ages to meet the shifts in warfare dynamics and leadership theories. To understand Mission Command fully, it's essential to trace its origins, pinpoint its early adopters and distinguish between the German strategy of Auftragstaktik and the modern interpretation of Mission Command. The inception of Mission Command dates back to the reforms of the 19th-century Prussian military, instigated by the aftermath of the Napoleonic Wars. These reforms aimed to introduce greater flexibility and encourage initiative among lower-ranking officers, a need highlighted by the inflexible command structures that previously led to Prussian defeats. It was during this era that the Prussian General Staff system was established, setting the foundation for Auftragstaktik, which would later be refined into today's Mission Command[1].

Within the operational framework of the United States Armed Forces, for example, the principle of Mission Command plays a crucial role in achieving mission success. It prioritizes a decentralized approach to carrying out orders, creating a setting in which initiative, discernment and innovation are highly valued. This strategy depends significantly on mutual trust, proficiency and a common comprehension among leaders, their teams and Allies. It ensures that all involved parties are dependable and adept in fulfilling their duties[2]. This concept, as well as the values derived from

[1] Echevarria, Antulio J. II, *„Auftragstaktik, or Directive Control, in the German Army"*, Military Review, 2000

[2] https://www.armyupress.army.mil/Journals/NCO-Journal/Archives/2020/May/Mission-Command/(accessed 12.11.2024)

it, has been embraced by the majority of the doctrines of the Allied states that are fighting for global military supremacy and represents the cornerstone in the effectiveness of executing any military conflict, particularly in regards to recent military conflicts that have bloodily marked the planet in the last few decades. Additionally, this approach is grounded in seven fundamental pillars (the maximum number of fundamental pillars that are doctrinally embraced at the level of the majority of the Allied navies, which have broad perspectives regarding doctrinal development to facilitate mission execution): commander's intent, competence, mission orders, mutual trust, shared understanding, disciplined initiative and risk acceptance[3].

My intention in the following lines is to highlight the main recent major conflicts (at least the most important two) and to explore whether from these conflicts certain lessons have been identified or learned in order to examine the relationship between military efficiency and the concept of Mission Command. It's possible that in certain conflicts, especially those where the United States of America is not directly involved, the concept of Mission Command might not be as prominently felt. This is based on a personal premise that, in recent conflicts where the USA was directly involved with troops, Mission Command has decisively contributed to the military efficiency on the ground and, consequently, to the tactical victory of the conflict. It's important to note that there are aspects within an armed conflict that cannot be won by military tactics alone - for example, „the past two decades of the U.S. reconstruction effort in Afghanistan. It details how the U.S. government struggled to develop a coherent strategy, understand how long the reconstruction mission would take, ensure its projects were sustainable, staff the mission with trained professionals, account for the challenges posed by insecurity, tailor efforts to the Afghan context and understand the impact of programs"[4].

In an effort to logically structure this paper and set the stage for what follows, I believe it's necessary to also reference the time period from which I have chosen to analyse several major conflicts that employed the concept of Mission Command. Based on reports and analyses provided by military experts and analysts, it can be observed that battlefield military effectiveness is closely linked to the pillars and principles of the Mission Command Concept. The term „recent", when referring to conflicts around the world is flexible and depends on the context in which it's used. Typically, it might encompass the last 10 to 20 years, aligning with the 21st century's new geopolitical dynamics, technological advancements in warfare and significant global events affecting security. This timeframe enables the analysis of modern conflicts, including their origins, tactics and global reactions. It provides insight into the current security challenges and the evolution of military strategies, particularly in discussions on how Mission Command can enhance military effectiveness.

Analysing the aforementioned timeframe and at the same time to somewhat support my theory that the concept of Mission Command is present and enhances military effectiveness when American troops are directly involved in the conflict (at least for the duration of ground military operations), I have chosen to focus on two major conflicts, namely: the conflict in Afghanistan post-2000 and the Ukraine Crisis.

As can be observed, these two major conflicts share a common denominator, which is the involvement of the United States, although this involvement does not occur to the same extent in all conflicts (various levels of involvement such as direct or indirect).

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[3] Headquarters Department of the Army, *ADP 6-0 Mission Command – Command and Control of Army Forces*, Army Doctrine Publication Washington D.C., 2019, p. 12;

[4] Special Inspector General for Afghanistan Reconstruction, *What we need to learn: lessons from twenty years of Afghanistan reconstruction*, Crystal Drive, Arlington, Virginia, 2021, p. 4

1. The conflict in Afghanistan (2001-2021)

It is characterized by several key phases: the U.S.-led Invasion of Afghanistan (2001), the NATO-ISAF Mission in Afghanistan (2003-2014), the Resolute Support Mission (2015-2021) and the U.S.-Taliban Agreement and Withdrawal (2020-2021).

Analysing the specific lessons from the Afghanistan war, particularly in terms of whether the Mission Command concept was correctly applied or not and its impact on military effectiveness, requires an understanding of the broad strategic, operational and tactical contexts. Official sources do not explicitly provide examples framed around the Mission Command concept, or even events specifically tied to its pillars.

2. Pillars of Mission Command

In a personal approach, bearing in mind the pillars of the Mission Command concept I can highlight the following: However, they do offer insights into key aspects of military effectiveness and decision-making that can be associated with the principles of Mission Command. These include:

a. Underestimation of Time and Resources: The U.S. government consistently underestimated the amount of time and resources needed to rebuild Afghanistan, creating unrealistic timelines and expectations. This led to prioritizing spending quickly, which increased corruption and reduced program effectiveness. A key aspect of Mission Command - understanding the operational environment - was overlooked, as U.S. officials ignored ground realities, leading to unsustainable short-term solutions that could not create conditions for a successful U.S. withdrawal.

- emphasizing situational awareness and local dynamics within the framework of Mission Command could have countered the tendency to underestimate the complexities of rebuilding Afghanistan. By fostering a deeper understanding of the operational environment, military leaders might have set more realistic timelines and allocated resources more effectively, avoiding the pitfalls of rushed expenditures and unrealistic expectations;

- by applying the principles of Mission Command, particularly decentralized decision-making, U.S. forces in Afghanistan could have been empowered to make on-the-spot adjustments based on ground realities. This flexibility might have mitigated the impact of corruption by allowing for a more targeted and accountable use of resources, enhancing the overall effectiveness of reconstruction efforts;

- Mission Command's emphasis on a commander's intent could have provided a clearer focus on long-term objectives rather than short-term gains, encouraging strategies that built sustainable systems and infrastructure. This approach would likely have promoted initiatives that aligned more closely with Afghanistan's specific needs and conditions, rather than imposing quick fixes that did not contribute to lasting stability;

- the principle of mutual trust, a cornerstone of Mission Command, might have facilitated better cooperation and understanding between U.S. forces and Afghan counterparts. Establishing strong, trust-based partnerships could have led to more effective collaboration and knowledge exchange, ultimately producing strategies that were more attuned to the nuances of the Afghan context and more resistant to corruption;

- leveraging the full spectrum of Mission Command to foster initiative among troops and leaders could have led to innovative solutions tailored to the unique challenges of the Afghanistan operation. Encouraging initiative would have allowed for more flexible and adaptive tactics, potentially uncovering unconventional but effective methods to address the deep-seated issues of rebuilding and stabilization, thereby laying a firmer foundation for a successful U.S. withdrawal.

b. Interoperability and Collaboration in the Afghan Mission Network (AMN): The AMN was a critical enabler of coalition information sharing, illustrating the Mission Command principle of creating a shared understanding among diverse partners. Enhancing collaboration and enabling interoperability on the AMN required relaxing various security constraints that had previously impeded the transfer and accessibility of mutually beneficial data. This approach fostered a „need-to-share" culture over a „need-to-know" mindset, critical for Mission Command to thrive in coalition operations[5].

3. Core principles of Mission Command

From a personal perspective, considering the core principles of the Mission Command concept, I would like to emphasize the following:

- leveraging the Afghan Mission Network (AMN) to enhance interoperability and collaboration among coalition forces exemplifies how the Mission Command principle of creating a shared understanding can significantly boost military effectiveness. By easing security constraints, the AMN facilitated a culture of information sharing, ensuring that all partners had access to vital data, thereby enabling more coordinated and effective operational decisions;
- the transformation of information-sharing practices within the AMN, from a „need-to-know" to a „need-to-share" mindset, directly reflects the Mission Command's emphasis on trust and mutual understanding. This shift not only improved the flow of crucial operational intelligence among coalition members but also amplified the collective capability to respond to emerging threats and challenges in a unified manner;
- the strategic adjustments made to the AMN to promote greater interoperability and collaboration underscore the importance of adaptability and flexibility under the Mission Command framework. These changes allowed for a more dynamic and responsive coalition force structure in Afghanistan, enhancing the ability to navigate the complexities of the operational environment through improved communication and shared situational awareness.

a. Cultural and Historical Understanding: A broader lesson from multiple interventions in Afghanistan, including British, Soviet and American efforts, highlights the importance of understanding and respecting the cultural, historical and geopolitical context of the operational environment. Overconfidence and a lack of appreciation for Afghanistan's complex social fabric, geography and history of resistance against foreign invaders led to repeated strategic failures. Mission Command emphasizes the importance of informed decision-making based on a deep understanding of the operational environment, suggesting that a lack of such understanding can severely impact military effectiveness[6].

Conclusion

From my viewpoint, taking into account the fundamental principles of the Mission Command concept in relation to military effectiveness, I wish to highlight the following:

- Mission Command's emphasis on informed decision-making, grounded in a profound understanding of the cultural, historical and geopolitical nuances of Afghanistan, suggests that appreciating this complexity is crucial for enhancing military effectiveness. The failures of past

[5] https://www.rand.org/pubs/research_reports/RR302.html (accessed 12.11.2024)

[6] https://www.rand.org/pubs/commentary/2021/09/lessons-from-afghanistan.html (accessed 12.11.2024)

interventions by British, Soviet and American forces underscore the dire consequences of overconfidence and insufficient respect for Afghanistan's intricate social fabric and history of resistance;

- by promoting a deep appreciation for Afghanistan's unique context, Mission Command principles could mitigate the strategic oversights that have historically undermined foreign military interventions. Recognizing the importance of cultural and historical awareness in the operational environment aligns with effective Mission Command, potentially averting the strategic missteps driven by a lack of such understanding.

The above examples demonstrate the multifaceted challenges faced in the Afghanistan war and underscore the importance of adhering to Mission Command principles such as understanding the operational environment, building cohesive teams through trust and exercising disciplined initiative. Each case reflects on how deviations from these principles can affect military effectiveness and the outcome of operations. Additionally, in this conflict, we can observe the abundant application of the principles of the Mission Command concept in attempts to achieve military effectiveness. With the United States directly involved in the conflict, there is also a continuous effort to adapt the Mission Command concept with the goal of enhancing military effectiveness. This proved challenging to implement throughout the duration of the conflict, but the majority of post-conflict reports demonstrate and confirm the interdependence between the pillars underpinning the Mission Command concept and military effectiveness in area of operations.

On the other hand, I have set out to analyse a more current conflict that is actively unfolding, which means that the process of collecting identified lessons so they can be learned is in continuous flux. In this context, I will attempt to explore the interdependency between military effectiveness and the application of the Mission Command concept. It's important to remember that Ukraine, from a doctrinal perspective, is in the process of embracing and testing the concept, lacking the experience of a state with a long history of practicing the concept over time. Furthermore, it's crucial not to overlook the fact that the United States is not directly involved in the conflict, which results in the application of the Mission Command concept being different compared to the previously analysed conflict. Therefore:

The Ukraine Crisis. The ongoing conflict following Russia's invasion has seen little territorial change despite intense military engagements. International sanctions against Russia have shown limited impact, underscoring the importance of continued support for Ukraine from the global community[7]. This conflict has proven to be more of a war of attrition, where resource planning and management continue to be crucial. Even under these conditions, there are several elements to analyse regarding the impact of the Mission Command concept on military effectiveness.

a. Logistical challenges and poor planning: the Russian military's logistical system faced considerable challenges due to poor training and planning. This inadequacy was evident in the initial phase of the war during the Russian advance towards Kyiv, where logistical vehicles were not properly protected, leading to inefficiencies in moving supplies to forward units. This logistical inadequacy severely impacted the effectiveness of Russian long-range strikes, highlighting a failure in Mission Command principles of enabling initiative and providing clear intent for logistical support[8].

[7] https://toda.org/global-outlook/2024/five-conflicts-to-keep-an-eye-on-in-2024.html (accessed 12.11.2024)

[8] https://www.csis.org/analysis/russias-ill-fated-invasion-ukraine-lessons-modern-warfare (accessed 12.11.2023)

My approach to addressing the logistical challenges and poor planning during the Russo-Ukrainian War involves the application of Mission Command pillars and principles to enhance military effectiveness by:

- Mutual Trust: building stronger trust between commanders and logistics units could ensure more adaptive and protected supply lines;
- Clear Commander's Intent: articulating a clear and achievable goal for logistics would guide efficient resource allocation and protection;
- Mission Orders: Empowering logistics commanders to make decisions on the ground could optimize supply routes and protection measures in real time;
- Disciplined Initiative: Encouraging logistics personnel to proactively address and solve supply chain vulnerabilities without awaiting direct orders.

These approaches emphasize the importance of flexibility, initiative and clear communication within the Mission Command framework to overcome logistical challenges and at the same time military effectiveness.

b. Underestimation of Ukrainian response and Western support: the planning and execution of the Russian ground offensive were based on incorrect assumptions about the Ukrainian military's and population's response, as well as the extent of Western support. This miscalculation led to difficulties in controlling occupied territories and integrating combined arms for seizing and holding Ukrainian territory. The force was also inadequately sized for its objectives, failing to block Ukraine's Western border to stop the inflow of foreign aid, reflecting a breakdown in Mission Command elements of understanding the operational environment and leveraging unified action[9].

Regarding this Underestimation of Ukrainian response and Western support, my personal approach to how the Mission Command concept could enhance military effectiveness is through:

- Comprehensive intelligence: deepening intelligence efforts to better understand Ukrainian capabilities and Western support intentions;
- Adaptive planning: dynamically adjusting military strategies in response to real-time feedback from the field;
- Decentralized execution: empowering lower-level commanders to make swift decisions based on their understanding of the situation;
- Leveraging joint capabilities: integrating various arms of the military more effectively to create a cohesive force;
- Prudent risk management: calculating risks more accurately to make informed decisions regarding force size and objectives.

These steps emphasize the importance of flexibility, local initiative and a deep understanding of the operational environment in enhancing military effectiveness.

c. Failure in cyber operations and electromagnetic warfare: Russian offensive cyber operations and electromagnetic warfare attempts to disrupt Ukrainian command and control were unsuccessful. Ukraine managed to counteract most cyberattacks with robust cyber defense strategies, aided by private companies and Western governments. This failure indicates a lack of effectiveness in employing all means of national power and leveraging innovation and initiative within the cyber domain, which are key aspects of the Mission Command concept[10].

[9] Idem (accessed 22.03.2024)

[10] Idem (accessed 12.11.2024)

To enhance military effectiveness in cyber operations and electromagnetic warfare during the Russo-Ukrainian War, applying Mission Command principles could have led to improvements in the following areas:

- Innovation and flexibility: encouraging a culture of innovation within cyber units to develop more effective electromagnetic warfare tactics and countermeasures;
- Integrated operations: ensuring cyber operations are fully integrated with all military activities, enhancing overall operational effectiveness;
- Continuous learning: implementing a system for rapid learning from both successes and failures in cyber operations to adapt strategies in real time.

These actions emphasize the importance of agility, coordination and learning in enhancing effectiveness, especially within the cyber domain.

In conclusion, whether we are analysing established conflicts that have spanned a longer period, like in Afghanistan, or ongoing crises, like the Ukraine Crisis, military effectiveness can and should be developed by fully leveraging the Mission Command concept. This involves developing all the pillars of the concept down to the last soldier in the hierarchy, ensuring a comprehensive and unified approach to military operations. However, it is observable that the depth to which belligerents have ingrained the principles of the Mission Command concept into their military doctrine correlates with their success in achieving enhanced military effectiveness.

Additionally, enhancing military effectiveness through Mission Command, as demonstrated in recent conflicts, involves leveraging its principles to address challenges such as underestimating adversaries, logistical shortcomings and cyber warfare failures. Key lessons highlight the importance of comprehensive intelligence, adaptive planning and fostering innovation within cyber operations. These approaches ensure more effective military strategies by promoting decentralized decision-making, mutual trust and continuous learning, crucial for overcoming operational challenges and achieving tactical victories in complex environments like those seen in Afghanistan and the Russo-Ukrainian War.

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THE INTEGRATION OF OSINT, SIGINT, AND TECHINT SOURCES IN MODERN MILITARY ANALYSIS

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Abstract:
Modern military analysis relies on integrating intelligence sources—OSINT, SIGINT, and TECHINT—to form a comprehensive picture of the operational environment. OSINT provides open-source insights, SIGINT intercepts communications, and TECHINT assesses enemy technology. Their combined use enhances accuracy, reduces misinformation, and supports effective decision-making. In today's volatile geopolitical climate, this "all-source intelligence" model is essential for informed military planning and command.

Keywords: *OSINT; SIGINT; TECHINT; intelligence; military analysis; information warfare; integration.*

Introduction

In the contemporary era, marked by hybrid conflicts, information warfare, and emerging technologies, information has become the decisive strategic weapon. Superiority on the battlefield is no longer determined solely by firepower or troop numbers, but by the ability to collect, analyze, and integrate data from diverse sources, transforming it into operational knowledge.

Modern military analysis increasingly relies on the concept of all-source intelligence, which entails correlating multiple types of sources to obtain the most accurate possible representation of the operational reality. Within this framework, OSINT, SIGINT, and TECHINT constitute three essential pillars of the informational architecture.

1. Open-Source Intelligence (OSINT)

Open-Source Intelligence (OSINT) refers to the systematic collection and analysis of information derived from publicly accessible sources, including traditional mass media, social networks, academic studies, official reports, and open databases. The exponential growth of digital content and online communication has made OSINT one of the most dynamic and valuable disciplines within modern intelligence analysis. Its accessibility, speed, and cost-effectiveness render it a crucial component for understanding complex operational environments.

OSINT's role in contemporary military operations has expanded dramatically due to the digitalization of conflict. Social media platforms such as Twitter/X, Telegram, and YouTube now serve as real-time information theaters, where data about troop movements, equipment losses, and battlefield events are instantly available. Analysts can extract patterns, verify authenticity, and correlate data across multiple sources to obtain a comprehensive situational picture. However, OSINT's openness is both its greatest advantage and its primary vulnerability. The abundance of information increases the risk of misinformation, manipulation, and propaganda, especially in hybrid

warfare contexts where state and non-state actors weaponized information to distort perceptions and mislead adversaries.

The United States' Intelligence Community Directive 301 defines OSINT as a "source of first resort" during crises or conflicts, emphasizing its potential to provide rapid insights into unfolding events. Nevertheless, as Lowenthal (2023) notes, open-source data require rigorous validation methods to ensure reliability. Verification, triangulation, and cross-referencing with classified sources are essential to prevent analytical errors.

Recent conflicts have highlighted OSINT's operational relevance. During the 2022–2023 war in Ukraine, independent OSINT communities such as Bellingcat and Oryx analyzed satellite imagery, social media footage, and geolocation data to confirm equipment losses, identify missile types, and even trace the origins of specific attacks. Their contributions demonstrated that open-source methods can rival, and at times complement, classified intelligence efforts. OSINT has thus evolved into an indispensable resource—one that supports transparency, strengthens situational awareness, and contributes to decision-making in both military and political contexts.

2. Signals Intelligence (SIGINT)

Signals Intelligence (SIGINT) encompasses the interception, collection, and analysis of electromagnetic signals to derive information about an adversary's communications, systems, and intentions. It comprises two primary branches: Communications Intelligence (COMINT), which focuses on voice, textual, and digital data exchanges; and Electronic Intelligence (ELINT), which examines radar emissions, sensor outputs, and non-communication signals. Together, these subfields enable a comprehensive understanding of enemy activity across the electromagnetic spectrum.

Historically, SIGINT has shaped the course of conflicts and the evolution of intelligence doctrine. From the decryption of German Enigma codes in World War II to Cold War-era satellite surveillance, signal interception has consistently offered strategic advantages. Today, modern SIGINT relies on a vast array of technologies—ground-based interception stations, airborne and maritime platforms, reconnaissance satellites, and cyber-intelligence systems—that collect data continuously across global theatres of operation.

SIGINT's value lies in its precision and immediacy. It allows for the identification of command centers, communication nodes, and electronic signatures associated with military assets. It plays a decisive role in threat anticipation, electronic warfare, and operational planning by revealing adversary movements and readiness levels before kinetic engagement occurs. In NATO doctrine (AJP-2), SIGINT is recognized as a critical enabler of situational awareness and as a primary contributor to the intelligence cycle.

However, SIGINT faces significant challenges in the modern era. The proliferation of encrypted communications, frequency-hopping systems, and cyber-defence technologies complicates interception and decryption. Moreover, the massive volume of intercepted data demands advanced analytical tools—machine learning, big data analytics, and automated decryption systems—to extract meaningful insights. Ethical and legal considerations also arise, particularly concerning privacy and state sovereignty, emphasizing the need for balanced oversight.

Despite these challenges, SIGINT remains one of the most reliable and indispensable intelligence disciplines. Its ability to reveal concealed intentions, confirm or refute open-source narratives, and provide time-sensitive warnings makes it a cornerstone of military and strategic intelligence in the 21st century.

3. Technical Intelligence (TECHINT)

Technical Intelligence (TECHINT) focuses on the collection, examination, and evaluation of foreign technologies, weapons, and equipment to assess the capabilities and intentions of potential adversaries. It provides tangible, data-driven insights into the technical sophistication, production methods, and operational efficiency of opposing forces. The analysis of captured, recovered, or observed materials—such as drones, missile fragments, and armored vehicles—allows for an objective understanding of an enemy's technological base and potential future developments.

The primary purpose of TECHINT is to transform physical evidence into actionable knowledge. Through laboratory analysis, reverse-engineering, and comparative evaluation, analysts can determine the origin, function, and effectiveness of foreign systems. This discipline directly informs countermeasure development, defence planning, and procurement strategies. For example, in the Ukrainian theatre of operations, the disassembly of downed unmanned aerial vehicles (UAVs) revealed imported electronic components and assembly methods, offering vital clues about supply chains and the technological dependencies of the adversary.

TECHINT also serves a predictive role by identifying trends in technological innovation. The U.S. Department of the Army emphasizes that TECHINT is not limited to cataloguing enemy equipment; rather, it anticipates future technological trajectories and their implications for strategic balance. The analysis of propulsion systems, guidance technologies, and composite materials, for instance, provides insight into emerging capabilities that may alter the nature of warfare.

Nonetheless, TECHINT faces inherent limitations. The availability of material evidence depends on battlefield conditions, and adversaries may deliberately modify or disguise equipment to mislead analysts. The exploitation process is often time-consuming, requiring expertise in multiple disciplines—from electronics and ballistics to materials engineering. Despite these constraints, TECHINT remains indispensable for sustaining technological superiority and ensuring that national defence strategies are grounded in empirical, verifiable data.

While OSINT, SIGINT, and TECHINT each possess unique strengths, none can independently produce a complete picture of the operational environment. Modern military analysis therefore depends on their integration into an all-source intelligence framework. The synergy among these disciplines enhances analytical accuracy, mitigates individual limitations, and transforms fragmented information into coherent strategic knowledge.

Integrated intelligence enables cross-validation: OSINT may reveal behavioral or discursive changes in an adversary's public posture; SIGINT can confirm whether those changes correspond to actual operational directives; and TECHINT provides physical evidence of the capabilities that support such actions. When fused, these sources create a multi-dimensional perspective that links political intent, operational behavior, and technological capacity.

This collaborative approach has been adopted as a doctrinal standard by NATO and its partners. The all-source intelligence model promotes inter-agency cooperation, shared data architectures, and interoperability between collection and analysis systems. The use of artificial intelligence, data fusion platforms, and integrated command-and-control (C2) systems further enhances the speed and precision of analytical outputs.

Moreover, integration facilitates predictive intelligence—the ability to anticipate adversarial moves based on cross-domain indicators. For instance, a sudden shift in open-source narratives (OSINT), accompanied by changes in encrypted communication patterns (SIGINT) and the deployment of new weapon prototypes (TECHINT), can collectively signal a forthcoming

escalation. Such multi-source synthesis strengthens the capacity for early warning and strategic deterrence.

Ultimately, the synergy among OSINT, SIGINT, and TECHINT defines the essence of modern intelligence work. It represents not merely a methodological preference but a structural necessity in an era characterized by information saturation, technological complexity, and hybrid threats. The future of military superiority will increasingly depend on how effectively intelligence communities can integrate these sources to produce timely, accurate, and actionable knowledge.

4. Technological innovation and the future of intelligence

Technological innovation has become the driving force of modern intelligence transformation. The rise of artificial intelligence (AI), machine learning, and big data analytics enables intelligence agencies to process immense volumes of data from OSINT, SIGINT, and TECHINT sources with unprecedented speed and precision. These tools automate information filtering, pattern detection, and correlation, allowing analysts to focus on interpretation rather than raw data processing.

In OSINT, AI supports rapid verification of digital content and detection of disinformation campaigns. Within SIGINT, it enhances decryption and classification of intercepted signals, while in TECHINT, 3D modelling and simulation technologies enable the virtual reconstruction and testing of captured systems. Integrated command-and-control (C2) platforms now ensure that intelligence products reach decision-makers almost instantly, reducing the reaction time between collection and action.

NATO and its partners increasingly promote an all-source intelligence model, which merges data from OSINT, SIGINT, TECHINT, HUMINT, IMINT, and MASINT into a unified analytical system. This integrated approach strengthens the accuracy of assessments, accelerates decision-making, and reduces the likelihood of operational surprises.

In essence, technology no longer merely supports intelligence—it defines it. The adoption of AI and data-driven methods ensures that intelligence remains proactive, predictive, and central to achieving informational superiority on the modern battlefield.

Conclusion

The integration of OSINT, SIGINT, and TECHINT represents a fundamental transformation in the way modern military forces perceive, interpret, and act within the operational environment. Each discipline contributes a distinct but complementary dimension: OSINT offers accessibility and speed; SIGINT delivers precision and early warning; TECHINT provides tangible, verifiable technical data. When correlated within a unified analytical framework, these sources generate a multidimensional understanding of reality—one that is both comprehensive and predictive.

In an era defined by hybrid threats, cyber operations, and rapid technological evolution, intelligence integration is no longer optional but essential. Fragmented or isolated analysis risks producing partial or misleading conclusions, while synergistic intelligence synthesis enhances accuracy and coherence at all command levels—strategic, operational, and tactical. The all-source intelligence model thus emerges as the cornerstone of effective decision-making in contemporary defence.

The future of military intelligence will belong to those institutions capable of fusing technology, expertise, and methodology into a single analytical process. The mastery of integration—between open, technical, and classified sources—will determine not only operational

success but also strategic stability. The capacity to transform data into knowledge and knowledge into action constitutes the true measure of military power in the 21st century.

Ultimately, the superiority of future armed forces will no longer be assessed solely by their firepower or numerical strength but by their ability to dominate the informational domain. OSINT, SIGINT, and TECHINT, when coherently combined, provide the foundation for that dominance—ensuring that military leadership can make decisions that are informed, rapid, and precise. In this sense, the integration of intelligence is not simply a methodological innovation; it is the strategic imperative of modern defence.

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ORGANIZATIONAL CULTURE AS AN ELEMENT OF INFORMATION SECURITY IN THE MILITARY

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Abstract:
The article explores the essential role of organizational culture in military information security. Beyond technology and regulations, security relies on shared values, norms, and behaviors that guide personnel in handling sensitive information. A strong culture prevents leaks, strengthens resilience against hybrid and cyber threats, and promotes discipline in following security rules. The analysis covers four areas: defining organizational culture in the military, its link to information security, risks from weak cultures, and strategies to reinforce cultural foundations for better information protection.

Keywords: *organizational culture; information security; military discipline; loyalty; leadership; confidentiality; NATO; resilience; ethics.*

Introduction

The contemporary era is characterized by hybrid conflicts, information warfare, and the proliferation of cyberattacks. In this context, information has become a strategic weapon, and its protection represents an absolute priority for the military. However, information security cannot be reduced merely to technical measures or legislation. It is closely connected to the cultural dimension of the military organization, which shapes the level of awareness, responsibility, and discipline of its personnel. Organizational culture, understood as a set of shared values and practices, thus becomes an "invisible shield" against threats, but also a potential source of vulnerability if it is weak or incoherent.

1. Characteristics of military organizational culture

Military organizational culture is characterized by specific traits that provide stability and efficiency in times of crisis. These features are not mere conventions but the result of historical evolution and adaptation to strategic and operational demands. One of the most evident characteristics of the military is the existence of a clearly defined chain of command. Authority is distributed across hierarchical levels, ensuring coherence in decision-making and coordination. In military contexts, decision-making ambiguity can have severe consequences, which is why hierarchy becomes a guarantor of order and operational efficiency.

Discipline represents a fundamental mechanism of cohesion. It implies the willingness of soldiers to execute orders, follow procedures, and assume responsibility even under extreme conditions. Through discipline, the military transforms heterogeneous groups into a unified and coordinated force. Similarly, tradition and symbolism—embodied in uniforms, flags, anthems, ceremonies, and branch-specific customs—strengthen collective identity and transmit to successive

generations a sense of continuity and belonging. These symbols act as moral and cultural anchors, sustaining the spirit of sacrifice and loyalty to the institution and the nation.

Solidarity among comrades, known as esprit de corps, is another central dimension of military culture. It generates cohesion, mutual trust, and the willingness to protect the group, even at the cost of one's life. In operational theatres and crisis situations, this collective spirit becomes decisive for morale and mission success.

A strong organizational culture constitutes a cornerstone of institutional resilience in the military. It manifests in the army's ability to withstand external pressures, hybrid threats, and psychological challenges. A military institution that possesses a well-established culture is able to sustain stability, even when confronted with significant military, political, or social crises. Shared values and norms function as an invisible shield that reduces vulnerability to external instability.

2. NATO, the European Union, and security culture

Within NATO, the concept of security culture occupies a main place in strategic documents. The Alliance highlights that true security relies not just on sophisticated technology or infrastructure, but also on a strong organizational culture embraced by everyone involved. This is particularly relevant for the protection of critical infrastructures and operational data, where even a minor human error can compromise the entire security chain.

NATO has developed awareness and training programs for both military and civilian personnel, focused on the importance of individual behavior and collective responsibility. All members should treat security as a personal responsibility, not just an institutional requirement.

Similarly, the European Union, within its Common Security and Defence Policy, places strong emphasis on developing cyber resilience. Through the European Union Agency for Cybersecurity (ENISA) and initiatives such as the NIS2 Directive, member states are required to adopt security measures grounded in an initiative-taking organizational culture. Western military organizations have implemented compulsory training for all ranks, conducted simulation exercises like red team versus blue team drills, and launched internal awareness initiatives that use actual case studies to demonstrate the impact of negligence.

These NATO and EU initiatives demonstrate that information security is not merely a technical concern but an integral element of organizational culture. Armies that successfully internalize these values across all levels—from enlisted personnel to general staff—are more resilient, better prepared to counter hybrid threats, and more capable of protecting both their people and critical infrastructures.

3. Challenges and contemporary risks

One of the major challenges facing modern militaries is the persistence of traditionalist mentalities that regard recent technologies with skepticism or treat them superficially. Bureaucratic rigidity and the attachment to "old ways of doing things" can delay the implementation of digital security measures, leaving institutions vulnerable to fast-evolving cyber and information threats. Another significant risk lies in underestimating the impact of social media and personal communication technologies. Numerous soldiers view online activity as innocuous, yet they may not recognize that sharing photos, remarks, or their whereabouts can inadvertently disclose vital details about current missions. This lack of awareness turns the digital sphere into fertile ground for adversaries exploiting even minor human errors.

Some military organizations may hide security incidents to avoid penalties or damage to their reputation. This "culture of silence" is extremely dangerous, as it allows vulnerabilities to persist. Conversely, a "culture of reporting," where personnel are encouraged to promptly disclose any

deviation or incident—no matter how minor—fosters trust and enables swift risk mitigation. Leadership is crucial in this regard, as the way superiors respond to such reports determines whether openness or concealment prevails.

4. Case studies and lessons from modern conflicts

Contemporary conflicts offer concrete examples of how culture influences information security. Cultural and behavioral factors have played a key role in operational security during the Ukraine war (2022–present).

1. Open-source intelligence indicates that in early 2023, more than 70% of Russian artillery strikes were guided by intercepted frontline mobile phone signals. The Ukrainian Armed Forces also suffered losses when soldiers' use of popular messaging apps such as **Telegram** and **WhatsApp** inadvertently revealed geolocation data. In **December 2022**, a single phone signal exposure in Makiyivka led to a **missile strike that killed over 80 Russian soldiers**, underscoring the fatal consequences of insufficient security culture.
2. Between 2022 and 2023, NATO monitoring centres identified **hundreds of cases** where soldiers publicly shared operational images on platforms like **TikTok** and **Instagram**, unintentionally revealing troop movements or base coordinates. The lack of awareness regarding digital footprints highlighted cultural gaps in understanding cyber risks within combat units.
3. In multiple coalition missions (2017–2021), social media posts by deployed personnel disclosed **classified locations and mission schedules**, forcing last-minute operational changes. These breaches were not the result of hacking, but of a lack of cultural adaptation to the digital environment.
4. Following these incidents, armed forces implemented structured awareness programs. For example, the **U.S. Department of Defence's "Think. Type. Post." campaign (2018)** reduced social media-related breaches by approximately **35%** within two years. Similarly, NATO's **"Operational Security Culture"** initiative introduced **mandatory digital behaviour courses** for all deployed units starting in **2021**.

These examples illustrate that information security depends not only on technology but, even more so, on organizational culture. Failures in discipline, awareness, or digital responsibility can result in devastating operational consequences, as seen in real-world conflicts. When cultural values, norms, and mindsets evolve in harmony with technological advances, the military becomes more resilient, adaptive, and capable of safeguarding sensitive information. Conversely, when culture lags, even the most advanced systems remain vulnerable to human error and manipulation.

5. Education, technology, and shared responsibility

Continuous education is a vital pillar for strengthening information security. Regular training adapted to innovative technologies and adversarial tactics does not merely transmit rules—it builds behavioral reflexes. Cyberattack simulations, red team/blue team exercises, and case studies based on real incidents enhance awareness, helping soldiers understand that every action—from using a mobile device to sending a message—has direct implications for operational security.

In today's military, security is not just the duty of IT personnel or security staff alone. All military personnel should make this practice routine. Creating a culture of shared responsibility means ensuring that all members feel personally accountable. Prompt incident reporting, procedural compliance, and diligence become expressions of active loyalty to the institution and its mission.

Technology, when used intelligently, can reinforce organizational culture. Artificial intelligence and big data analytics allow real-time monitoring of informational risks and the identification of abnormal behaviors. In addition to their technical applications, these tools may be

utilized within training programmers to demonstrate system vulnerabilities and highlight the potential ramifications of security breaches. In this way, technology becomes an ally of the security culture rather than a mere technical barrier.

In NATO and EU operations, cultural diversity can represent both a challenge and an opportunity. Soldiers from different nations bring distinct traditions, values, and organizational practices. To avoid cultural conflicts and security gaps, it is essential to develop common standards and a convergent organizational culture regarding information protection. Cultural interoperability is developed through collaborative exercises, shared experiences, and the establishment of a standardized organizational language that emphasizes informational discipline and collective accountability.

Conclusion

Organizational culture constitutes the foundation of information security within the military. Beyond technologies, procedures, and regulations, the human factor remains both the greatest vulnerability and the strongest line of defence.

A military institution in which values such as confidentiality, loyalty, and responsibility are deeply internalized by all members will be far more resilient in the face of hybrid threats and information warfare. Organizational culture functions as the first line of defence against error, negligence, or manipulation, providing cohesion and stability even in the most challenging circumstances.

At the same time, it amplifies the effectiveness of technical instruments, transforming rules and security procedures from mere administrative constraints into institutional reflexes shared by all. Military leadership, continuous training programs, and the assumption of collective responsibility are the essential ingredients for building a solid organizational culture. Only under these conditions can the military remain protected not only through technology but through its people—making information security an organic component of military identity.

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COMMANDING OFFICERS' ROLE IN MOTIVATING PEOPLE IN THE ARMENIAN ARMY

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Abstract

This essay examines the pivotal role of commanding officers in motivating soldiers within the Armenian Armed Forces. It delves into how effective leadership transcends mere command, focusing instead on fostering deep commitment, resilience, and optimal performance, particularly in challenging geopolitical contexts. The discussion explores key motivational strategies, including building trust and respect, ensuring clear communication aligned with national vision, leading by personal example and courage, empowering and developing subordinates, providing culturally relevant recognition, and cultivating strong unit cohesion and esprit de corps. Ultimately, the essay argues that a commanding officer's ability to inspire and sustain motivation is fundamental to the success of missions and the overall security of the Armenian nation.

Keywords*:motivation; armed forces; commandind officers;trust, cohesion; success.*

1. Introduction

Within the hierarchical structure of the Armenian Armed Forces, characterized by a disciplined chain of command essential for national defense, the role of a commanding officer extends far beyond mere strategic planning, resource allocation, and tactical execution. While these foundational elements are undoubtedly critical for military operations, a commander's most profound and enduring impact lies in their ability to genuinely motivate the soldiers under their charge. In a nation like Armenia, with its rich military history—marked by pivotal moments such as the Battle of Avarayr, the heroic stand at Sardarabad, and the recent Artsakh Wars, which deeply in still a sense of national duty and sacrifice—and confronted by ongoing geopolitical challenges including persistent border tensions, regional instability, and the constant imperative of safeguarding sovereignty, the need for a highly motivated fighting force is paramount [1].

Motivation, in this specific context, is not merely about compliance with orders but about fostering a deep-seated commitment rooted in hayrenasirutyan (patriotism), cultivating an unyielding resilience in the face of immense pressure, and an unwavering willingness to perform optimally [2]. This is especially crucial when confronting adversity and high-stakes defense scenarios, which can involve harsh mountainous terrain, extreme weather conditions, and the ever-present threat to civilian populations and ancestral lands. This essay will therefore meticulously explore the multifaceted role of commanding officers in motivating their personnel within the Armenian army, examining various leadership styles (which often lean towards a paternalistic yet demanding approach), psychological principles (leveraging collective memory and national pride), and practical strategies they employ to inspire dedication, cohesion, and peak performance, often drawing upon the unique cultural and historical ethos of Armenia, where concepts of family, community, and national survival are deeply intertwined with military service.

2. The Foundation of Trust and Respect

At the core of effective motivation within the Armenian military is the establishment of profound trust and respect. A commanding officer who is trusted and respected by their subordinates creates an environment where soldiers feel valued, heard, and confident in their leadership, particularly given the critical role of the Armenian army in national defense.

2.1 Building Trust

Trust is built through consistent, ethical behavior, transparency (where operational security permits), and a demonstrated, unwavering commitment to the well-being and safety of the troops. When Armenian soldiers believe their commander genuinely prioritizes their welfare and the nation's security, they are far more likely to commit fully to the mission and endure significant hardships.

Example: During harsh winter conditions on a frontline position, a commanding officer not only ensures that all soldiers have adequate cold-weather gear and hot meals but also personally inspects living quarters, addresses individual concerns about heating or supplies, and even spends nights on the front lines alongside their troops. This direct involvement and shared hardship, rather than simply delegating, demonstrates a genuine commitment to their well-being, fostering deep trust. If a soldier faces a personal or family emergency, a commander who goes out of their way to provide support or facilitate leave, within military regulations, further solidifies this trust, showing that the commander cares for them as individuals, not just as military assets.

2.2 Earning Respect

Respect, conversely, is earned through demonstrated competence in military strategy and tactics, unyielding integrity, and absolute fairness in treatment, regardless of rank or background. A commander who displays expertise, makes sound decisions, and treats all personnel equitably naturally garners respect, fostering a reciprocal relationship that forms the bedrock upon which all other motivational efforts are built.

Example: During a complex border patrol operation in challenging terrain, the commanding officer personally leads the most difficult reconnaissance segment, utilizing their expert knowledge of the local geography and enemy tactics to navigate safely and gather critical intelligence. Later, when a disciplinary issue arises involving a soldier from a prominent family and another from a modest background, the commander conducts a thorough, unbiased investigation and applies the regulations strictly and equally to both, despite potential external pressures. This combination of demonstrable tactical skill and unwavering commitment to justice earns the deep respect of every soldier, solidifying their belief in the commander's leadership and fairness.

3. Clear Communication and National Vision

One of the most potent tools in an Armenian commanding officer's motivational arsenal is clear and consistent communication, deeply rooted in the national vision. Soldiers are profoundly motivated when they understand the "why" behind their tasks and the broader national defense objectives they are contributing to.

3.1 Articulating Mission and Significance

A commanding officer must articulate the mission, objectives, and their significance in a way that resonates with every individual, often connecting it to Armenia's historical struggles, national

identity, and the imperative of protecting the homeland [3]. This involves not only conveying directives but also explaining the strategic context, the existential impact of their efforts, and the critical importance of each soldier's role within the larger framework of national security.

Example: Before a border defense exercise, the commanding officer reminds the unit of the land's historical significance, linking their duties to past Armenian sacrifices. They then clearly outline the exercise's objectives, explaining how these maneuvers directly protect nearby villages and deter aggression. The commander emphasizes, "Every effort you make here is a continuation of our ancestors' vigilance. Your dedication ensures our families' safety and Armenia's future. Your role is vital to this sacred duty." This speech connects the immediate task to a profound historical and national purpose.

3.2 Fostering Purpose and Ownership

When Armenian personnel grasp how their individual contributions safeguard their families, communities, and national sovereignty, they develop an unparalleled sense of purpose and ownership. Furthermore, effective communication involves active listening, providing constructive feedback, and maintaining open channels for dialogue, ensuring that concerns are addressed and soldiers feel genuinely involved in the defense effort.

Example: During planning for a new observation post, the commander invites junior soldiers' insights on terrain and logistics. A private identifies a crucial water source. The commander acknowledges this, adjusts the plan, and credits the soldier publicly. Throughout construction, the commander engages with soldiers, offering advice and accepting suggestions for improvements. This active participation and recognition foster ownership, showing every soldier's perspective is valued in defending the homeland.

4. Leading by Example and Unwavering Courage

Actions speak louder than words, and this adage holds particular weight for commanding officers in the Armenian army, where historical valor and personal sacrifice are deeply ingrained. Leading by example is an indispensable motivational technique. A commander's willingness to share hardships, face dangers alongside their troops, and embody the very values they preach builds an undeniable bond and inspires emulation.

4.1 Demonstrating Expected Qualities

When a commander demonstrates the very qualities they expect from their subordinates—such as discipline, resilience, unwavering courage in the face of threats, integrity, and a strong work ethic—it sets a powerful precedent. Armenian soldiers are more likely to push their limits and embrace challenges if they see their leader doing the same, especially in the demanding operational environments they often face.

Example: If a commander expects their unit to maintain immaculate barracks, they ensure their own office and quarters are spotless. If they demand punctuality for drills, they are always the first to arrive. This consistent personal adherence to high standards, rather than just giving orders, inspires soldiers to follow suit, fostering a culture of discipline and excellence throughout the unit.

4.2 Inspiring Confidence in Adversity

In high-stress or dangerous situations, a commander's personal courage, composure, and willingness to share risks can be profoundly motivating, instilling confidence and reducing fear among the ranks. Conversely, a commander who preaches one thing but practices another will quickly erode trust and undermine morale. Authenticity and consistency between words and deeds

are paramount, inspiring emulation and fostering a culture of excellence and unwavering commitment to the defense of the nation.

Example: During a sudden, unexpected enemy ambush, the commanding officer does not panic or retreat but immediately assesses the situation, issues clear counter-attack orders, and personally leads a flanking maneuver. Their calm demeanor and decisive action under fire reassure the soldiers, transforming potential chaos into organized resistance and boosting their confidence to fight effectively.

5. Empowering and Developing Soldiers

Effective Armenian commanding officers understand that motivation is not solely about external incentives (like promotions or awards) but also about fostering intrinsic drive, which is a deeper, self-sustaining commitment stemming from within. This intrinsic motivation is crucial for long-term dedication and optimal performance, especially given the demanding nature of military service and the existential threats faced by Armenia. This is achieved primarily through two interconnected strategies: empowering soldiers and investing in their professional development [2].

5.1 Delegating Responsibility and Autonomy

Empowerment involves delegating responsibility, trusting individuals to make decisions within their purview, and providing them with the autonomy necessary to complete tasks. When Armenian soldiers feel they have agency, are entrusted with significant responsibilities, and their initiative is valued, their sense of competence and self-worth increases, leading to greater job satisfaction and motivation.

Example: A commanding officer assigns a junior sergeant the lead role in planning and executing a routine supply convoy to a remote outpost. Instead of micromanaging, the officer provides clear objectives and resources but allows the sergeant to determine the best route, timing, and security measures. This trust in the sergeant's judgment fosters their confidence and sense of responsibility.

5.2 Investing in Professional Growth

Moreover, a commanding officer plays a crucial role in the continuous development of their team. This includes providing opportunities for specialized training, mentorship, and career progression within the armed forces, recognizing achievements, and offering constructive criticism that helps individuals improve their military skills and leadership potential. By demonstrating a genuine interest in their subordinates' career progression and personal growth, commanders cultivate loyalty and a desire to excel, knowing that their efforts are recognized and supported.

Example: A commander notices a young private with a keen interest in drone technology. They arrange for the private to attend a specialized drone operation course, even if it means temporary reassignment. Upon the private's return, the commander assigns them the responsibility of training other soldiers in basic drone surveillance, integrating their new skills into the unit's operations. This direct investment in the soldier's specific talent and career path fosters immense loyalty and motivates others to seek similar development opportunities.

6. Recognition and Rewards within the Armenian Military Context

While intrinsic motivation, stemming from patriotism and personal commitment, is undeniably powerful and fundamental to the Armenian military, external recognition and appropriate rewards also play a significant and complementary role. These external motivators are crucial for sustaining morale over time, especially during prolonged periods of high stress or routine duties, and

for reinforcing desired behaviors by visibly acknowledging exceptional effort and achievement. Commanding officers must therefore be adept at identifying and acknowledging the efforts and achievements of their personnel, ensuring that no act of valor, diligence, or initiative goes unnoticed. This dual approach—nurturing internal drive while strategically applying external appreciation—creates a comprehensive motivational framework [4].

6.1 Forms of Recognition

This can range from formal commendations, promotions, and military honors to informal praise, public recognition within the unit, and even simple gestures of appreciation that resonate within the Armenian cultural context of respect and camaraderie. The key is that recognition should be timely, specific, and genuinely heartfelt.

Example: After a successful patrol, the commanding officer publicly commends a soldier for their exceptional vigilance, shaking their hand and acknowledging their contribution in front of the entire unit. For a more significant achievement, like mastering a new weapon system, the commander might ensure the soldier receives a formal commendation or even recommends them for a specialized training program, demonstrating tangible appreciation.

6.2 Impact on Morale and Performance

When Armenian soldiers feel their hard work, dedication, and sacrifices are noticed and valued, it significantly boosts their morale and encourages continued high performance. Rewards, whether tangible or intangible, should be perceived as fair and directly linked to performance and contribution to national security, creating a positive feedback loop that reinforces the idea that dedication and excellence are recognized and rewarded within the Armenian Armed Forces.

Example: A unit successfully completes a challenging multi-day training exercise in harsh conditions, exceeding all expectations. The commanding officer ensures that not only are the top performers recognized individually, but the entire unit receives a special commendation during a formation. Additionally, they might arrange for a well-deserved extended rest period or a unit recreational event, demonstrating that their collective effort is genuinely valued and directly leads to tangible benefits and improved well-being. This reinforces that their sacrifices are seen, appreciated, and lead to positive outcomes, further motivating them for future challenges.

7. Fostering Cohesion and Esprit de Corps

A highly motivated unit in the Armenian army is often characterized by exceptionally strong cohesion and a powerful esprit de corps. Cohesion refers to the bonds that tie soldiers together, both task-related (working effectively as a team) and social (liking and trusting each other). Esprit de corps is the collective spirit, pride, and enthusiasm of a unit, a shared sense of honor and dedication. These elements are often deeply rooted in a profound sense of national identity (their shared Armenian heritage, history, and destiny) and brotherhood (the strong, familial-like bonds forged through shared hardship and mutual reliance). Commanding officers are instrumental in cultivating this sense of shared identity, purpose, and camaraderie, transforming a group of individuals into a unified and resilient fighting force.

7.1 Promoting Teamwork and Mutual Support

This involves promoting teamwork, encouraging mutual support, and creating opportunities for personnel to bond both professionally and socially, recognizing the strong communal bonds prevalent in Armenian society.

Example: After a rigorous week of joint drills, a commanding officer might organize an informal unit gathering, perhaps a traditional Armenian barbecue (khorovats) or a friendly sports competition between platoons. This allows soldiers to relax, share stories, and build camaraderie outside of formal duties, strengthening their interpersonal bonds and their sense of being part of a supportive "family" within the military.

7.2 Building Unit Pride

Activities that build unit pride, such as shared training experiences, commemorative events honoring national heroes, and even informal gatherings, contribute to a strong collective identity. When Armenian soldiers feel a strong sense of belonging and loyalty to their unit, their comrades, and the nation, they are motivated not only by personal goals but also by an unwavering desire to uphold the unit's reputation and defend their fellow members and homeland. A commander who prioritizes the well-being and interconnectedness of their team builds a resilient and highly motivated force, ready to face any challenge for Armenia.

Example: A commander organizes a unit-wide competition for designing a new unit patch that incorporates Armenian symbols and reflects their specific mission. The winning design is then officially adopted and worn by all soldiers, creating a tangible symbol of their shared identity and unique contribution to the Armenian Armed Forces. This fosters a sense of pride and belonging that goes beyond individual achievement, tying their service to a collective legacy.

8. Conclusion

he role of a commanding officer in motivating soldiers within the Armenian Army is complex, dynamic, and absolutely vital to the success of any mission and the security of the nation. This complexity stems from the constantly evolving nature of military threats and the diverse psychological needs of individual soldiers, while its vitality is underscored by Armenia's critical geopolitical position. It transcends simple authority, meaning it's not just about giving orders, but about influencing hearts and minds. This leadership delves deeply into the realms of human psychology, understanding what drives individuals; leadership, applying effective principles; and interpersonal dynamics, fostering strong relationships within the unit. This is particularly effective when drawing upon the unique cultural and historical resilience of the Armenian people, leveraging their deep-seated patriotism (hayrenasirutyan), their collective memory of historical struggles and triumphs (like Avarayr or Sardarabad), and their strong communal bonds.

By consistently applying the strategies outlined in this essay—building a foundation of profound trust and respect, communicating a clear national vision that connects daily tasks to the defense of the homeland, leading by unwavering example in both discipline and courage, empowering and developing soldiers through responsibility and growth opportunities, providing timely and culturally relevant recognition for their efforts, and fostering strong unit cohesion and esprit de corps through shared experiences and pride—Armenian commanding officers can inspire their personnel to achieve extraordinary feats. These feats might include maintaining vigilant defense in harsh border conditions, demonstrating exceptional resilience during unexpected engagements, or innovating solutions under pressure. Their ability to ignite and sustain this deep motivation transforms a group of individuals into a unified, resilient, and high-performing force. This force is characterized by unwavering morale, strong internal bonds, and a collective determination to excel, making it capable of overcoming immense challenges such as prolonged conflicts, resource limitations, and psychological pressures. Ultimately, this ensures the collective defense and prosperity of Armenia. Therefore, the effectiveness of an Armenian commanding officer is measured not just by their strategic acumen and tactical brilliance, but profoundly by the

unwavering spirit, dedication, and patriotism of the soldiers they lead, embodying the true strength of the Armenian Armed Forces.

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MILITARY DRONE – THE WEAPON OF THE 21ST CENTURY

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Abstract:

This article is dedicated to the emergence and development of civilian and military drones, in the context of armed conflicts, especially in recent times. The military field has undergone profound changes through the diversity of combat actions and weapons. It has been demonstrated that the use of all means and forces in an armed confrontation significantly changes the physiognomy of the battle and the armed operation/conflict as a whole. The content and the nature of security threats. Armed conflicts are increasingly showing their dependence on artificial intelligence, profoundly changing the art of war. Technological advantages, especially those related to artificial intelligence (AI), have become decisive, and military superiority is no longer determined by the number of troops and the power of conventional weapons. Drones and AI-guided missiles are omnipresent in combat operations. Thus, drones in the near future will be equipped with increased artificial intelligence, which will ensure a maximum degree of efficiency. It is possible that drones will have unlimited access and the ability to changes (adapts), so that it can move from one environment to another or move on the ground. The drone may become the symbolic weapon of the 21st century.
But, as soon as a new type of combat weapon has appeared, new changes must immediately appear in the doctrines and tactics of conducting combat operations.

Keywords: *military drone, artificial intelligence, armed conflict, security, threat, military doctrine, interoperability.*

1. Introduction

Recently, threats to global, regional or national security have undergone the greatest change. Previously, during the Cold War, threats and challenges were launched by states, and large armies were preferred. Thus, they were based on conventional weapons, to which nuclear weapons are also added. These armies are inadequate to the current challenges, because currently conflicts are usually fought between states and other non-state actors, such as, for example, terrorist organizations or other rebel factions and organizations [5]. The beginning of the century and the millennium highlights new concepts of conducting military conflicts. The military field has undergone profound changes through the diversity of combat actions and weapons. It has been demonstrated that the use of all means and forces in an armed confrontation significantly changes the physiognomy of the battle and the armed operation/conflict as a whole. The content and nature of threats to security have also changed significantly. Armed conflicts increasingly show their dependence on artificial intelligence, profoundly modifying the art of war. Technological advantages, especially those related to artificial intelligence (AI), have become decisive, and military superiority is no longer determined by the number of troops and the power of conventional weapons. The concepts of the use of forces and means, as well as the way of conducting battles in the classic version of a symmetrical war "army against army" are outdated, revolutionary changes appear in the military field. At the same

time, as Admiral Rob Bauer, NLD-N, Chairman of the NATO Military Committee, noted in his Address to the Allied Chiefs of Defence, 18-19 January 2023, - "The war [in Ukraine] has also shown us that we must be able to fight the battles of tomorrow as well as those of yesterday [...] today. Modern warfare is as much about 'bits and robots' as it is about "mud and blood" [3].

Depending on several factors and methods of sensing combat technologies, categories of weapons, their chronology, etc., the classification of changes differs. For example, Krepinevich, a senior researcher at the Hudson Institute, deputy senior researcher at the Center for a New American Security, identifies ten such military changes, which he calls "military revolutions".

2. "Military revolutions"

We propose to refer to only a few of them, namely: – the revolution at the level of infantry, in which its role increased in relation to cavalry; – the revolution in the field of artillery; – the revolution in the field of firearms; – the Napoleonic revolution in logistics and organization; – the revolution in the way of conducting naval warfare (the emergence of the submarine); – the nuclear revolution [6]. Based on current armed conflicts, we propose to analyze some new characteristics of the battlefield in future armed conflicts: – the leadership process will be dominated by the informational/decisional element for the permanent coordination of all categories of forces and types of weapons, both vertically and horizontally;

– hostilities will be a true confrontation between human intelligences and will no longer be just a clash between forces and means;

– tactical structures will be flexible, mobile, with a great capacity for striking and maneuvering;

– action procedures will diversify until the decisive role of surprise is achieved and the initiative and supremacy are ensured;

– the front precisely delimited between "own troops" and "enemy troops" has disappeared;

– combat actions will increase in the urban environment;

– "surgical" actions will be carried out based on precise information;

– special importance will be given to support, even for small groups;

– combat actions will be carried out in areas still inhabited by civilians, where specific measures must be taken to reduce or even eliminate collateral damage.

Thus, in the joint defense operation, Ukrainian commanders used the new Military Security Strategy, approved in 2021, by developing territorial defense forces, modernizing weapons systems, and using asymmetric defensive actions (Zaniewicz 2021). This doctrine Modern military technology, amplified by the use of allied anti-tank and anti-aircraft missiles, together with Turkish Bayraktar TB2 drones [7], has truly changed the fate of war, as happened in Afghanistan (in 1978) and Nagorno-Karabakh (2020) [2].

Artificial Intelligence (AI) and Armed Warfare

The war in Ukraine also demonstrates the main transformations that AI brings to the conduct of armed warfare, namely:

1. The emergence of autonomous weapon swarms – Drones and AI-guided missiles are ubiquitous;
2. Self-learning weapons – Each weapon transmits data to other units to improve its effectiveness;
3. Camouflage becomes impossible – Image analysis algorithms can detect any change in terrain almost instantly;

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2. Self-learning weapons – Each weapon transmits data to other units to improve its effectiveness;
3. Camouflage becomes impossible – Image analysis algorithms can detect any change in terrain almost instantly;
4. Radio jamming becomes useless – AI can generate perfectly credible imitative communications, eliminating the traditional advantage of electronic warfare;
5. Electronic warfare loses its meaning – Combat units become completely autonomous;
6. Real-time communications interception – Captured conversations are instantly translated and analyzed;
7. Battlefield reconstruction from passive signals – AI can determine the position of artillery from the noise captured by troop microphones;
8. Rapid adaptation to enemy tactics – Any strategy only works once.

Thus, we see that drones and AI-guided missiles are omnipresent in combat operations. According to Dex, a drone is an unmanned aerial vehicle (UAV), guided from a distance. They can be guided by remote control from a ground control center or by a digital autopilot located in another piloted aircraft.

History shows us that, before new technologies were applied in the military field, they were used in civilian life, for example, railways or dynamite. Drones are also used in the civilian and military fields. Civilian drones can be used to perform various missions for commercial or recreational purposes, and military drones are used for combat missions, such as: surveillance, reconnaissance, espionage or for combat purposes. Depending on the purpose, they have the necessary equipment and/or weapons as their payload.

4. Civilian and military drones. The history of their emergence and development

We propose to analyze the emergence and evolution of drones, as well as the characteristics of some military drones. For the first time a drone in the modern sense flew in 1975. This was an Israeli drone of the Tadiran Mastiff type, which had a data transmission system, and the ability to transmit live video images to the base from where it was coordinated and had a long-term flight capacity. (fig.1).

Fig. 1 Tadiran Mastiff drone

Currently, drones are increasingly sophisticated, assembled with various physical components, which do not differ from manned aircraft. The difference is in the space where the pilot of the aircraft and the environmental control system or life support systems are located. Some civilian drones are designed to carry a payload, for example a video camera, which obviously weighs less than an adult human and, as a result, can be very small. Such drones do not need life-critical systems and therefore can be built and assembled from lighter but less resistant materials and can use weaker, but very well-tested electronic control systems. Another model of drone is the **quadcopter-4-rotor design**, which has become popular, even if it is rarely used for manned aircraft. For these aircraft, it is necessary to equip them with electric motors and batteries, and the miniaturization of drones offers the possibility of using new, cheaper and weaker propulsion technologies.

Technologies in this field are constantly developing. Currently, the **Phantom 1** drone has reached the 4th generation, which will be put into use - from 2026. It belongs to the category of quadcopters. It has a flight time of about 15 minutes, can be equipped with an optional support for transmitting video images and uses an autopilot system, which allows it to hover stably in the air. Another type of combat weapon is a medium-altitude unmanned aerial vehicle **Northrop Grumman Bat**, which was originally intended for use by the United States Armed Forces. It has a wingspan of 4.3 m and can carry a weight of up to 45 kg. This aerial vehicle has an autonomy of 18 hours and can reach an altitude of 5.2 km above sea level.

The Bayraktar TB2 drone stands out from other drones with its flight range of up to 27 hours. It has a maximum speed of 220 km/h and a flight ceiling of 5,500 meters, with the ability to carry a weight of up to 150 kg, including weapons, on its attachment points. Equipped with automatic navigation systems, multiple sensors and semi-automatic flight functions, the drone is designed for various missions, from surveillance and reconnaissance to directing artillery fire and ground attacks. Another combat weapon of this type is the **Northrop Grumman MQ-8 Fire Scout** drone. This is an autonomous unmanned helicopter, developed by Northrop Grumman for use by the United States Armed Forces. The drone is designed for combat missions such as reconnaissance, air fire support, etc.

One of the larger models expected for the near future is the BAE Taranis drone. This is a British demonstration program for unmanned combat aerial vehicle (UCAV) technology, being developed primarily by defense contractor BAE Systems Military Air & Information. The aircraft, named after the Celtic god of thunder Taranis, first flew in 2013. As an unmanned warplane, the Taranis is designed to fly intercontinental missions and would carry a variety of weapons, allowing it to attack both air and ground targets. It uses stealth technology, giving it a low radar profile, and is controllable via satellite link from anywhere on Earth [1].

Military technologies are not limited to aerial drones (ships). They tend to develop in all environments.

According to YDN News, on March 25, 2025 CSBC Corporation announced the introduction of Taiwan's first unmanned surface military ship, called **"Endeavor Manta"**. (fig.2). This is a trimaran-type drone ship measuring **8.6 meters by 3.7 meters**, built of fiber-reinforced plastic.

Fig. 2 The **"Endeavor Manta"** drone ship

This ship was unveiled by a Kaohsiung-based shipbuilder. In the vision of its designers, it is ideal for operations in the dangerous Taiwan Strait, according to Focus Taiwan. The president of CSBC Corp., Taiwan, Huang Cheng-hung, said that his company began development of the military USV in early 2024. The ship has a maximum speed of 35 nautical miles (65 km/h – ed.) and can carry a load of more than one metric ton. The maritime drone is equipped with a multi-modal communications system, including 4G, radio frequencies and satellite. It also has artificial intelligence for targeting, anti-piracy systems and an autonomous group navigation system with collision avoidance function. According to Huang, the **Endeavor Manta** can carry explosives and light torpedoes.

The use of military drones continued at the end of the 20th century. They were designed, manufactured and tested, some directly in military confrontations in several increasingly high-performance variants. The trend continues in the 21st century.

The war in Ukraine also demonstrates the emergence of new combat weapons, which are much more affordable, but at the same time can replace aviation and artillery with a high degree of success in destroying enemy targets. In particular, we are referring to **kamikaze drones**. Colonel-General Oleksandr Sirsky, commander of the armed forces of Ukraine, announced on January 5, 2025, that Ukraine in December 2024 "hit over 54,000 Russian targets", 49% of which were carried out with the help of kamikaze drones.

Another novelty and modification of combat weapons, reaching performance, used in the Russian-Ukrainian war is the **"wired" drone**. Unlike classic drones, they are controlled by fiber optic cables, making them impossible to jam electronically. The control cables can reach a length of up to 15-20 kilometers and can carry a load of about 5 kilograms. According to data from a Ukrainian company that produces such drones, they cannot be located or detected by any electronic system. Moreover, neither the place of launch of the drone nor the operator who controls it can be detected. For radio waves, they are invisible.

Conclusion

Currently, military drones are present and very important in the arsenal of any strong army, having the ability to penetrate enemy territory unnoticed, to monitor the deployments and actions of combat units in different weather and seasonal conditions, as well as to transmit the information in detail and in a short time. Another purpose of these drones is to destroy important enemy targets. These unmanned aircraft are also used for precise attacks on armored vehicles and enemy units.

In addition to Western countries, which produce and own drones, there are other states, such as: Israel, Pakistan, India, Turkey, China, Russia and Iran, which produce and own various types of drones.

According to Global Data Plc, a London-based data analytics and consulting firm, the global market for unmanned aerial systems (UAS), which forms a significant part of the UAV industry, is expected to grow at a compound annual growth rate of 4.8% over the next decade. This represents a nearly doubling of the market size, from $12.5 billion in 2024 to approximately $20 billion by 2034. The effective use of drones in the wars in Afghanistan, Iraq and Ukraine highlights the expansion of their role in the future, representing a priority for the world's states.

Thus, drones in the near future will be equipped with increased artificial intelligence, which will ensure their maximum efficiency. It is possible that drones will have unlimited access and have the ability to change (adapt), so that they can move from one environment to another or move on the ground. Drones will be able to solve complex situations, both civilian and military, if necessary. The drone may become the symbolic weapon of the 21st century.

But, as soon as a new type of combat weapon has appeared, new changes must immediately appear in the doctrines and tactics of conducting combat operations, and interoperable standards of forces, as well as adequate capabilities for the production and use of such weapons, such as modern combat drones, must be developed and implemented. Interoperability standards are very important in providing industry with guidelines for the production of its equipment [4].

These would imply ways of using the armed forces, with which they are equipped, taking into account the technological capacity of the weapons and the equipment used.

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UNIT PERFORMANCE MANAGEMENT: EFFECTIVENESS, COHESION, READINESS

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Abstract:

Unit performance management and unit level of readiness are one of the most important issues in a military organization. It helps the unit identify where it is in the process of achieving its goals, what challenges and barriers it faces, as well as review short-term and long-term plans, thereby increasing the unit's effectiveness and making it more effective.

Unit performance management is directly related to its effectiveness, cohesion, readiness. The main point of the paper is to analyze the importance of unit performance and determine interconnection between the unit performance and effectiveness, cohesion and readiness also identify most common unit performance management systems and analyze how they are employed. To achieve the goal set in the thesis, the paper discusses the following issues: unit performance management meaning in military system, defining role of performance management a unit effectiveness context, types of cohesion and performance management influence of unit cohesion, unit readiness assessment tools and performance management importance, in the paper will be reviewed: various sources on the issue that was raised, also the paper will propose definitions of the most common unit performance management systems and some practical examples of what kind of roles they are playing in the military organization development.

As a result of the paper, it was determined that unit performance management holds an irreplaceable place in unit effectiveness, cohesion, readiness. It can be said, that unit performance management and measuring organizational effectiveness play kay role in the development of organization and the achievement of its goals.

***Keywords:management**; performance; cohesion; readiness; challenges; effectiveness.*

Introduction

An organization is a group of people whose activities are consciously coordinated to achieve a common goal, or in most cases, several interrelated goals. Throughout the history of its functioning, the organization has constantly strived to become more effective than it is today. To this end, they develop strategies and subsequently implement all procedures according to this strategy, determine short-term and long-term action plans, introduce various effective tools through which they can evaluate their achievements, identify weaknesses, reveal shortcomings and subsequently take care of their development. In addition, along with all this, it is vitally important that employee involvement in all the above processes is high. For an organization to be successful over the long term, it must be both effective and efficient. In the words of Peter Drucker, a renowned management researcher, effectiveness is achieved when an organization is "doing the right things," while efficiency is achieved when an organization is "doing things right."

In the military context, Unit Performance Management involves the systematic evaluation and enhancement of a unit's capability to accomplish assigned missions. It focuses on three core dimensions: **operational effectiveness**, **cohesion**, and **readiness**. **Operational effectiveness** measures how well a unit performs its mission tasks, often influenced by leadership, doctrine, and mission planning (Shamir et al., 2000). **Cohesion**, both task and social, strengthens trust and

collaboration among personnel, contributing directly to morale and combat performance (Griffith, 2002). **Readiness** assesses a unit's ability to deploy and operate effectively, accounting for personnel strength, training levels, equipment status, and logistical support (Castro & McGurk, 2007).

Unit Performance Management is challenged by high operational tempo, resource constraints, and dynamic combat environments. Therefore, it relies on integrated performance metrics, feedback mechanisms, and regular assessments to maintain high standards and adaptability.
Unit performance management involves assessing, monitoring, and improving the performance of a unit (such as a team, department, or business division) within an organization. Various types or approaches to unit performance management are recognized, often depending on the context (e.g., corporate, military, public sector). Unit performance management is relevant and of special importance for every military system and for the effectiveness of the defence forces, in general. Unit performance management is related to processes such as career and professional development, effectiveness, cohesion, readiness, motivation. Accordingly, the theme unit performance management: effectiveness, cohesion, readiness is always relevant and essentially important for defence forces.

3. Defining role of performance management a unit effectiveness context

Unit effectiveness refers to the ability of a team, department, or operational group (a "unit") within an organization to achieve its intended goals efficiently and consistently. It encompasses both the outcomes produced by the unit and the processes used to produce them, including performance quality, resource utilization, teamwork, adaptability, and alignment with organizational objectives.
In military and organizational contexts, Siebold (2007) describes unit effectiveness as a combination of performance outcomes and cohesion factors, stating that effectiveness is not only about executing tasks, but also about maintaining the readiness, morale, and resilience of the team.
The U.S. Army defines unit effectiveness as "the extent to which a unit accomplishes its mission while maintaining the well-being and discipline of its personnel" (U.S. Army, 2012). This comprehensive definition includes both objective performance and subjective elements such as morale and leadership quality.

Performance management is a continuous process that ensures individual and team goals align with an organization's strategic objectives. In the context of unit effectiveness, it plays a critical role in driving efficiency, accountability, and improvement within a specific functional or operational unit (e.g., a department, team, or division).
In a unit effectiveness context, performance management acts as the engine that connects individual contributions to broader organizational success. It ensures that a unit operates efficiently, meets its targets, and continuously improves through structured goal setting, monitoring, and feedback mechanisms.

Performance management is a strategic and integrated process that aligns individual and team objectives with the broader goals of an organization. In the context of unit effectiveness, performance management plays a pivotal role in shaping operational efficiency, enhancing workforce engagement, and ensuring goal alignment within departments or functional areas. At its core, performance management involves setting clear expectations, monitoring progress, offering regular feedback, and enabling continuous improvement (AIHR, 2023).
One of the primary roles of performance management in enhancing unit effectiveness is goal alignment. Through structured planning and communication, performance management ensures that

the objectives of a unit are tightly linked to organizational strategies, helping to focus efforts and resources in the right direction (SAP, n.d.).
Additionally, performance management fosters accountability by clarifying roles, responsibilities, and performance standards for employees.
Lastly, performance data collected through these systems supports evidence-based decision-making. Managers can assess trends, pinpoint bottlenecks, and allocate resources more efficiently, thereby reinforcing unit effectiveness (MDPI, 2024).

1.1 . Types of Cohesion and performance management influence of unit cohesion

Cohesion refers to the strength of the bonds, unity, and commitment among members of a group or team. It reflects the extent to which individuals are attracted to the group and motivated to remain part of it, work collaboratively, and pursue shared goals. Cohesion can influence performance, satisfaction, communication, and resilience within both civilian and military organizations.

Cohesion is a critical element in team and unit effectiveness, reflecting the strength of the bonds that hold members together. Scholars generally recognize three major types of cohesion: **task cohesion, social cohesion, and collective cohesion**. These dimensions interact to support group stability, performance, and resilience.

Task cohesion refers to the shared commitment of team members to achieve common goals or complete assigned tasks. It is rooted in a clear understanding of objectives, structured roles, and mutual support to accomplish work-related responsibilities (Carron, Widmeyer, & Brawley, 1985). Teams with high task cohesion tend to be more focused, efficient, and aligned in purpose.

Social cohesion involves the interpersonal relationships and emotional bonds among members. When strong, social cohesion leads to higher trust, communication, and morale, all of which contribute to smoother collaboration and reduced interpersonal conflict (Evans & Dion, 1991). It reflects the degree to which team members enjoy each other's company and are committed to each other on a personal level.

Collective cohesion, also referred to as group pride or identity cohesion, is the sense of belonging and loyalty that individuals feel toward their team or unit. It is particularly important in high-pressure or hierarchical environments, where group identity reinforces perseverance, loyalty, and morale (Siebold, 2007).
In conclusion, performance management is more than a system of oversight—it is a powerful lever for building cohesion. By addressing the structural, interpersonal, and identity-based dimensions of team dynamics, effective performance management directly contributes to a more unified, resilient, and high-performing unit.

1.2. Unit readiness assessment tools and performance management importance

Unit readiness assessment tools are structured methods and instruments used to evaluate a unit's preparedness to perform its assigned tasks or missions. These tools help leaders determine whether a team or department has the necessary personnel, equipment, training, and morale to operate effectively. They are especially critical in military, emergency response, and organizational performance contexts.

Categories of Readiness Assessment Tools

- *Personnel Readiness Tools*
- *Training Readiness Tools*
- *Equipment and Logistics Readiness Tools*
- *Operational or Mission Readiness Tools*

Readiness tools serve both diagnostic and planning functions. They Identify capability gaps, Inform resource allocation and training needs, provide accountability for preparedness, Support decision-making during crisis planning or operational deployment (GAO, 2016).

Unit readiness assessment and performance management are deeply interconnected processes that together ensure an organization's or unit's capacity to achieve its objectives under both routine and critical conditions. While readiness assessments focus on evaluating a unit's capability to execute its missions, performance management ensures that the individuals and teams within the unit are continuously improving, aligned with strategic goals, and prepared to meet evolving demands Unit readiness assessment is a structured evaluation of a unit's personnel, training, equipment, and mission capability. It answers the question: Is the unit prepared to perform its tasks? (U.S. Department of the Army, 2011). On the other hand, performance management refers to the continuous process of setting expectations, monitoring progress, providing feedback, and developing individuals to improve overall outcomes (Armstrong, 2020). The synergy between the two lies in their mutual focus on capability, efficiency, and accountability.

Readiness assessments often reveal performance gaps—such as untrained personnel, equipment deficiencies, or poor leadership—that performance management systems must address. For example, a Unit Status Report (USR) indicating low training readiness will trigger targeted performance management interventions, such as revised training plans, competency evaluations, or coaching programs (GAO, 2016).

Likewise, a robust performance management system improves readiness by ensuring that team members are trained, motivated, and meeting individual and collective objectives. When leaders actively manage performance through feedback, goal alignment, and development plans, units become more agile and responsive, directly enhancing operational readiness (Weiner, 2009).

In high-stakes environments like the military or emergency services, this interdependency becomes even more critical. Units that regularly assess readiness without linking results to performance management risk stagnation. Conversely, performance systems that ignore readiness outcomes may focus on individual metrics without improving mission capability.

In conclusion, unit readiness and performance management are not isolated systems—they form a continuous feedback loop. Readiness assessments identify needs; performance management addresses them. Together, they enable a cycle of preparedness, improvement, and resilience essential for organizational success.

4. Unit Performance Management Systems

Unit Performance Management (UPM) systems are structured frameworks used to monitor, assess, and enhance the performance of military units. These systems integrate **data collection**, **performance metrics**, and **feedback mechanisms** to support decision-making and improve operational outcomes.

The Most Common UPM Systems:

a. **Mission Essential Task List (METL)-based Systems:** Focus on a unit's ability to perform critical mission tasks, often integrated with digital training and simulation tools.

The METL framework is foundational in U.S. and allied military organizations. Each unit identifies its mission-essential tasks based on higher command directives and operational roles. Performance is assessed through training evaluations, field exercises, and mission simulations. METL enables commanders to prioritize resources and tailor training to real-world requirements.

b. **After Action Review (AAR) Systems:** Provide structured debriefs post-mission to evaluate performance and identify lessons learned.

AARs are structured debriefings conducted post-mission or training event to assess what occurred, why it happened, and how future performance can improve. AARs promote accountability and learning at the unit level, with a focus on team dynamics, tactics, and leadership.

c. **Defence Readiness Reporting System (DRRS):** A DoD-wide system that links strategic objectives to unit-level readiness.

Military units utilize readiness reporting tools such as the Defense Readiness Reporting System (DRRS) in the U.S., or equivalents like Joint Personnel Administration in the UK, to measure personnel strength, equipment serviceability, and training status. These systems provide real-time data to leadership on a unit's capacity to deploy and sustain operations.

d. Commander's Inspection Programs (CIP)

Many militaries implement CIPs to enforce standards and verify unit compliance with regulations and readiness benchmarks. These inspections often include surprise audits and structured reviews of logistics, administration, and operational capabilities.

e. Performance Appraisal and Leadership Evaluation

Military leadership emphasizes both individual and collective performance. Systems like the Officer Evaluation Report (OER) and Non-Commissioned Officer Evaluation Report (NCOER) in the U.S. Army assess leadership effectiveness, command climate, and contribution to unit success. These evaluations indirectly reflect unit performance.

3.Mission Essential Task List (METL)-based System

The **Mission Essential Task List (METL)** system is a structured method used by the U.S. Army to align unit training with wartime and operational missions. In practice, commanders develop METLs by analyzing their higher unit's mission, evaluating implied and specified tasks, and selecting those essential for success. This process ensures all levels, from company to division, focus on relevant, mission-driven tasks. Each unit's METL must be validated and approved two levels up in the chain of command.

The system emphasizes a **team approach**, requiring close collaboration between commanders and senior NCOs. It integrates collective, leader, and individual Soldier tasks through a clear hierarchy, linking tasks from squad-level up to brigade-level operations. Resources like training time and equipment are allocated based on these essential tasks.

System's Approach

The METL approach is **mission-focused and scalable:**

- It narrows training to mission-critical tasks.
- It follows a **top-down and bottom-up alignment**, with higher HQ approving subordinate METLs and using them to derive battle tasks.
- It integrates seven Battlefield Operating Systems (e.g., intelligence, maneuver, fire support) to holistically support mission success.
- It uses **task-condition-standard** as a framework for setting and evaluating training objectives.

Ultimately, the METL system serves as a **strategic training blueprint**, ensuring readiness for both traditional warfare and contemporary challenges like terrorism and homeland security.

METL-Based System: Advantages and Disadvantages

Advantages

1. **Mission-Focused Training**
   METL ensures that training is directly tied to the unit's wartime and operational missions, allowing commanders to focus on the most critical tasks for success.

2. **Structured and Scalable Approach**
   The system provides a clear, hierarchical structure where each level (company to brigade) aligns its METL with higher headquarters, creating a coherent training and operational framework.
3. **Task Integration across All Levels**
   METL integrates collective, leader, and Soldier tasks, reinforcing unity of effort and ensuring that individual actions support larger mission goals.
4. **Flexibility Across Units**
   METLs are tailored to specific unit missions and locations, allowing adaptability across different operational environments.
5. **Supports Resource Allocation**
   Once METL tasks are identified, commanders can prioritize and allocate limited training resources like ammunition, land, and time more effectively.

Disadvantages

1. **Resource Constraints in Execution**
   While METL development is not limited by resources, actual training is. Units may lack the materials or time needed to achieve proficiency on all selected tasks.
2. **Overwhelming Task Load**
   Units cannot train on every possible task, leading to difficult decisions about prioritization and sometimes a lack of depth in non-METL areas.
3. **Approval Delays and Bureaucracy**
   METLs must be reviewed and approved by two higher levels of command, which can slow down the process and reduce flexibility.
4. **Potential Misalignment**
   Differences in missions and contexts may lead to challenges in aligning METLs across units, especially in joint or coalition operations.

Conclusion

In the 21th century, where environment is always changing every day, increasing the level of readiness and efficiency of the defence forces and its units is a constant challenge for all modern states. Unit Performance Management is critical in military and organizational contexts, encompassing the assessment and optimization of a unit's **effectiveness**, **cohesion**, and **readiness**. Also there are key challenges that this issue includes:

- Maintaining readiness amid frequent deployments or organizational restructuring.
- Sustaining unit cohesion in diverse or rapidly assembled teams.
- Evaluating performance accurately in complex and dynamic environments.

The issue discussed in the paper showed us, that unit performance management is strongly linked of unit effectiveness, cohesion and readiness. One of the main challenge is to adopt right strategy and method. Effective unit performance management requires continuous assessment tools, adaptive leadership, and a strong feedback culture to navigate these challenges and maintain mission alignment.

In conclusion, proper functioning of the performance management system, proper employee career management and professional development system are essential for increasing unit effectiveness and readiness levels and are the best way to measure and increase organizational effectiveness.

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FUNDAMENTAL ETHICAL CHALLENGES IN PERFORMANCE MANAGEMENT WITHIN BUREAUCRATIC INSTITUTIONS

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Abstract:
The values underpinning performance management in any organization are trust, individual and procedural fairness, constructive feedback, respect and decision-making transparency. However, the very nature of bureaucratic institutions represented by features like job specialization, standardization, rules and procedures, paperwork, record-keeping, and hierarchy of authority may inadvertently generate ethical challenges impeding upon honest and effective performance and henceforth the results of performance evaluation. Consequently, the goal of the current article is to analyze the most challenging situations in bureaucratic institutions from the perspective of performance management, namely human resource performance assessment and evaluation, and make a number of recommendations by which the latter can be reformed.

Key words: bureaucracy, procedural compliance, organizational effectiveness, professional autonomy, discretion, ethical values, accountability, transparency

1.Introduction

The ethical challenges raised by the management of performance in bureaucratic institutions ensue from the rigidity of their hierarchies, the standardization of their processes, and the need to measure outputs rather than outcomes. Lack of accountability on behalf of managers, strict adherence to rules over the needs of the people who should benefit from their application, lack of transparency in decision-making, biases, and favoritism are some of the issues that have transformed the notion of bureaucracy as initially proposed by Weber into a much-argued concept (Weber, 1946; Argyris, 1964; Merton, 1940). Self-regulation of employees, professional discretion in decision-making, initiative, creativity, and entrepreneurship become areas of collusion with the process of bureaucratization itself, as Weber himself describes it (Weber, 1946). This tension between bureaucratic structures and the need for ethical flexibility in decision-making and performance management continues to raise important questions about how best to balance efficiency, fairness, and human well-being within bureaucratic institutions (Wang, 2019; Crozier, 1964).

2. Procedural Compliance over Performance Outcomes

One common practice characteristic of bureaucracies is the prioritization of procedural compliance over performance outcomes. In such cases, performance management is driven by employees' compliance with rules and procedures, while the delivery of meaningful results comes second or can be completely disregarded (Weber, 1946; Merton, 1940). The disconnect that becomes apparent in such cases is between high ratings granted to those who excel at following rules but may

not necessarily contribute to overall organizational effectiveness and those employees who serve both the letter and the spirit of the same rules (Merton, 1940). The ethical values mostly challenged by such an approach are justice, fairness, accountability, and individuals' wellbeing. In professions like doctors, educators, lawyers, and social workers, high decision-making autonomy is granted by training, expertise, and experience. Therefore, nuanced understanding of contextual factors may call for them to exercise discretion in order to reach better outcomes for their beneficiaries (Lipsky, 1980). However, rigid bureaucratic processes must be followed regardless of context, requiring sometimes that professional integrity and moral agency be disregarded (Simon, 1947).

For example, when a healthcare system is highly centralized and professionals must follow strict guidelines and protocols set in a centralized manner, patients' needs do not necessarily come first. What counts in such a system are numbers, such as the number of surgeries performed or patients treated rather than the quality of healthcare delivery or patient satisfaction (Weber, 1922). Similarly, in educational systems relying on standardized curricula and testing, what is highly rated is the number of students graduating and not the growth of individual students over time, nor the integration of disadvantaged students or the capacity of graduating students to apply the knowledge and skills they acquired and enter a competitive labor market (Weber, 1922; Simon, 1947).

Besides issues related to professional autonomy and integrity, these examples highlight the lack of equity, since focusing on numbers rather than group or individual needs prevents bureaucratic systems from addressing ethnic, gender, or other types of disparities (Scanlon, 1998). Procedural compliance dilutes accountability; therefore, sanctions are applied if, for example, boxes in a process-based checklist are not properly ticked with little to no attention paid to final outcomes. Those at risk in such situations are individuals with urgent needs, such as children from disadvantaged families, communities at risk, or patients who do not fit bureaucratically set eligibility criteria for access to needed medication (Merton, 1940).

Another value heavily impacted by a bureaucratic organization's over-reliance on following procedures is its lack of transparency. Internal processes are not visible to external observers or beneficiaries, whereas tangible results—or lack thereof—are. As a result, lack of clarity and openness may generate the perception of a depersonalized system where people are treated just as mere cogs in a wheel and not as individuals with complex needs and interests. In the long run, trust—a fundamental value for customer-centric organizations—is breached (Blau, 1964; Weick, 1995).

Last but not least, human dignity, empathy, and compassion are also values at risk when procedural compliance prevails over performance-based outcomes. The type of ethic that drives this logic is deontological: the duty to follow the rules is more important than addressing the nuanced effects of the same rules (Kant, 1785). It also branches into legalism—namely, the prioritization of the letter of the law over the spirit of the law—or contractualism, where procedural compliance emerges from social or organizational contracts aimed at providing for the majority's equal treatment while failing to address the needs of underrepresented categories (Scanlon, 1998).

The impact of such approaches can be dire. In the long run, they lead to organizational ineffectiveness, harm to individual needs, and lack of trust in the management of the organization. The end product is the "bureaucratic virtuoso" (Merton, 1940) or "narrow specialists without mind," according to Weber (1946).

3.Rating Inflation

Bureaucratic organizations are risk-averse and stability is the cornerstone of their existence. Their design is centered on maintaining predictability of processes and results for outside

stakeholders, as well as internal consistency and order (Crozier, 1964). However, stability may clash with the dynamics of performance management, especially in external environments where economic, socio-cultural, geo-political, and technological changes are the norm rather than the exception (Riccucci, 2002).

Furthermore, the tendency of bureaucratic institutions to employ highly standardized performance evaluation tools that do not necessarily capture nuances in individual performance may lead managers to rate their subordinates very highly to avoid navigating through various constraints or complexity. Additionally, lower ratings may be associated with the possibility of employees appealing decisions, which generates administrative burdens due to required documentation (Golman & Bhatia, 2012). Another feature of bureaucracies is that performance incentives linked to ratings are often limited and sometimes depend on managerial discretion rather than objective results (Sims & Gioia, 1987).

Bureaucratic organizations are also more likely to experience performance rating inflation, particularly when the phenomenon has become a legacy. This inflation raises the baseline for acceptable performance, making honest performance reviews difficult and discouraging deviation from the unwritten norms (Golman & Bhatia, 2012; Sims & Gioia, 1987). This phenomenon helps bureaucracies minimize risks such as budget cuts, avoid scrutiny from higher management or external stakeholders, protect established organizational order, especially when incentives are not strongly linked to performance ratings, and reduce conflicts arising from critical feedback (Fried et al., 1999). At the organizational level, inflated ratings make it difficult to identify underperforming areas and justify resource reallocation. At the individual level, inflated ratings linked to compensation perpetuate the status quo and complicate managerial decision-making (Fried et al., 1999).

The impact of performance rating inflation is manifold. It fosters managerial cynicism and reduces integrity and work ethic. Lack of inter-rater reliability undermines the legitimate link between performance and merit-based pay, eroding employee trust in evaluation systems and lowering morale (Fried et al., 1999). Ethical values challenged by rating inflation include honesty, transparency, fairness, accountability, and integrity, as they affect honest feedback, equitable treatment, and responsible resource allocation.

Some of the ethical values challenged by the phenomenon of performance rating inflation in bureaucratic organizations are:

- honesty – related to how, when, if and why feedback is provided;
- transparency – differences in performance need, at least theoretically, be related to performance improvement plans at the level of employees, increases or decreases in compensation packages and promotion opportunities – all of which require transparent human resource management functions and integrated links among those;
- fairness – regardless of how well or poorly employees perform, they are not differentiated by the ratings they receive – which leads to complacency and decreased efficiency and productivity;
- accountability – poor performers will maintain their behavior if unaddressed by the telltale signs of their performance evaluation ratings, whereas in the case of managers there is no direct impact on their departments when resources are allocated, and
- integrity – the capacity of the overall performance management in an organization, along with the conduct of associated human resource management functions like compensation, career management, professional development are negatively impacted by performance rating inflation.

4.Patronage Mechanisms

The salient features of a bureaucracy are standardized procedures, clear chain of command, documented decision-making, merit-based promotion and an ethos of professionalism. However, under this veil of procedural legitimacy and objectivity, there is a wide scope for subjectivity rendered by performance evaluation dimensions like talent, teamwork, initiative, and cultural fit, to mention just few. Discretion in the evaluation of all of the above or in the interpretation of their behavioral indicators, personal relationships, and informal networks may predispose the people in charge of performance evaluation in bureaucratic institutions to biases and even flawed conclusions. Additionally, rigid career paths may promote mediocre people over brilliant ones in cases when bureaucratic standardization of career path requires track records highlighting consistency in pursuing a career path over excellence in jobs held over time that can be measured by tangible results (Toral, 2024).

One of the main reasons and consequently challenges in performance evaluation is career advancement. Therefore, the discussion on fundamental challenges to the former cannot be separated from the latter. In this respect, patronage mechanisms like "homosocial reproduction", "bureaucratic sponsorship", or "ticket punching" represent practices that do not necessarily agree with the need for objectivity in performance evaluation. Thus, the merit-based approach, even though well documented and institutionalized, may still predispose towards the selection and promotion of people from particular socio-economic backgrounds or graduating from elite educational institutions. The phenomenon is known as "homosocial reproduction" and signals the tendency of decision-makers to favor those resembling themselves. Even though there may be the self-perception that performance evaluation is conducted objectively, biases related to similarities or dissimilarities in terms of educational background, membership in particular social networks or the use of certain communication styles are still likely to prevail (Kanter, 1977; Toral, 2024).

Additionally, "bureaucratic sponsorship" is a practice that reflects how promotion is facilitated in bureaucratic institutions. The concept of mentorship that underlies it may be subverted when the presence of a mentor or sponsor in higher positions favors the promotion of mentees to the detriment of possibly equally meritorious people. Last but not the least, the common practice of "ticket punching" in military – namely obtaining specific assignments that are essential for promotion – often allows people who manage to secure highly coveted positions while not necessarily excelling to be promoted over people who may be equally or even more qualified and with better performance ratings but do not necessarily meet the necessary track record formally agreed for the career path. This phenomenon was notably pervasive during the Vietnam War era, when officers sought brief command or visible staff positions mainly to check career boxes rather than demonstrate leadership competence (New York Times, 1992). Contemporary critiques highlight how rapid job rotations and emphasis on "ticket punching" undermine true operational experience and leadership development, often leading to toxic careerism and inefficiencies in the military personnel system (Kane, 2013).

Patronage systems are more prominent when political connections determine promotion decisions. In such cases, performance evaluation is used as post-hoc evidence of a predetermined outcome. When a candidate is earmarked for career advancement, their performance record is constructed or interpreted to support the decision. Alas, capable employees lacking political support may receive adequate ratings to keep them from advancing regardless of their actual performance. In such cases, the challenge is not only for individuals only, but for organizations themselves. In the

long run in such organizations leadership quality deteriorates while talent waste and attrition lead to organizational decline and possibly demise on long term (Tiwari, S. et al, 2024).

For example, in the Brazilian public administration system, studies have shown that politically appointed bureaucrats often receive retrospective performance appraisals that emphasize alignment with political goals and responsiveness to elected officials over strict merit-based criteria (Toral, 2024). In practice, this means that once a candidate is identified as having political backing, their performance evaluations are shaped to highlight achievements and downplay shortcomings, effectively legitimizing predetermined promotion decisions.

Similarly, in South Africa's public sector, political patronage has influenced executive appointments in state-owned enterprises where performance records are selectively presented to justify politically motivated appointments, despite documented inefficiencies and operational failures (Myeza et al., 2024). These examples reveal how bureaucratic performance data can be molded post hoc to fit career trajectories endorsed by political or institutional power structures, which undermines transparency and meritocracy in public administration

5.Personal and Professional Development

Bureaucratic institutions excel at generating piles of performance documentation. Sadly however, performance reviews are not necessarily focused on performance improvement or employees' professional or personal growth. They are predominantly exercises in form completion, checking boxes, assigning numerical ratings and making sure that the signoff of decision makers certifies fulfillment of procedural requirements. Form over content prevails in bureaucratic organizations and impact valid performance evaluation results. The factors contributing to such a phenomenon could be managers' self-reportedly lack of time, but also legal and political consequences. In an environment where anything that is documented can be used for filing grievances, appeals or litigation, managers tend to tend to become cautionary about providing negative ratings or precise feedback. Consequently, the ratings and their wording is rather cautious and vague and formulated as "satisfactory performance" or "meets expectations" (Pandey, 2005).

Also, the typical annual or semi-annual scheduling of performance reviews makes any feedback outdated by the time the evaluation is conducted. Thus, critical incidents throughout a year's time do not receive the attention that could prompt further improvement on behalf of the employees and the organizations. On the contrary, the rather artificial scheduling of the review does not allow it to address real time aspects and leads to missed opportunities for performance correction and learning (DeNisi & Murphy, 2017).

Bureaucracies are also defined by indeterminate contracts for employees or by tenure systems. That makes performance based termination difficult if not impossible and managers working is such organizational systems do not see value in providing honest feedback. The resulting agreement is that managers do not question employees' performance, nor do employees challenge managers' decisions. Such an organizational culture becomes high risk averse and employees learn inadvertently that safe conventional approaches to doing things are always validated. When honest feedback is occasionally provided in such organizations, it comes as a shock and is perceived as unfair. Furthermore, if honest feedback is provided irregularly and is not followed by professional or personal development actions, it is perceived as bias rather than an opportunity for improvement (Rauch, 2000).

The professions where feedback contributes extensively to development are those where expertise is the result of continuous learning like in education, healthcare, or social work. Quality

assurance inherent in those makes feedback as a means for personal and professional development a pillar for individual and organizational growth (Bovaird & Löffler, 2021).

6. Recommendations and Conclusions

The ethical challenges identified in this article represent some of the most common issues that employees working in bureaucratic organizations face. The need for structure and consistency which are the salient features of the Weberian bureaucracy remains. However, the contemporary environment where technology generates major disruptions, people are more mobile than ever and the new generations of employees value development and flexibility requires achieving balance between the need for standardization and flexibility, the creation of accountability mechanisms for managers, building or consolidating transparent appeals processes, training on ethical decision-making, and last but not the least periodic audits of rating systems and their recalibrations.

Concerning the dilemma of balancing procedural compliance with outcome accomplishment, the nature of a profession should be the primary criterion by which to prioritize performance indicators. Thus, for jobs where following protocols matters, that should be the primary evaluation criterions. On the other hand, in work environments where professional judgment, adaptation to circumstances, autonomy matter more than compliance, the latter should be only used as a baseline, whereas the former should carry more weight in performance evaluation. To that end, well established discretion based decision-making frameworks could better serve the ultimate purposes of performance evaluation. That would entail principle based policies focused on allowing flexibility that can be assumed based on clear and unequivocal documentation of exceptions. Additionally, the review and update of procedures should ne done on a regular basis and based on just-in-time methodology. With a view to that, it is not only employees who should be empowered to flag those procedures that hinder their effectiveness in achieving performance objectives and outcomes, but the processes for addressing their concerns should be streamlined to allow for fast decision-making and appropriate changes of counterproductive policies, rules, regulations or practices.

Accountability and transparency are the litmus test for ethical decision-making in any organization. Managers can be made accountable for their employees' performance evaluations through a consequence based system inbuilt in their own performance evaluation criteria. Their future career path, as well as their professional development should also be linked to the quality of their performance evaluations, their feedback skills or biases they might demonstrate. In this respect, evaluators should also be evaluated on the quality, specificity and developmental value of the feedback they provide. Focusing the evaluators' evaluation on how their employees' assessment contributes to development rather than to mere documentation of employees' performance adequacy or inadequacy is another course of action that could be taken. Additionally, accountability as a requirement to document the ratings that are above average could be a solution especially in a performance management system where rating inflation might be a phenomenon that is not necessarily controlled, or for which mandatory distribution guidelines may do more harm than good for high performing teams and individuals.

Managers' biases and discretionary behavior in evaluating their subordinates' performance can be addressed through appeal mechanisms and external review panels that can ensure fairness and transparency. For those to properly work, clear requirements for performance evaluation substantiation must exist and be applied both for initial evaluations and for appeals. Additionally, timeliness in addressing appeals is essential in order not to impede both managers' and employees' ongoing work.

One of the key factors contributing to finding better solutions to situations where the need for procedural compliance clashes with the need for outcome focused performance is managers training in the ethical challenges of performance evaluation. That can be done on the job though scenario based approaches or with the support of peers and human resource ethics advisors.

Last but not the least, the quality of any performance evaluation system needs to be assessed whether it is still fit for purpose. With a view to that, regular data collection is required in order to allow timely analysis of performance ratings across units and demographics. The goal is to identify patterns in ratings, possible disparities among units performing similar functions or demographic differences.

In conclusion, the ethical challenges raised by performance management in bureaucratic institutions are not inevitable. They are the consequence of the tension between the basic tenets of what a bureaucracy needs to provide, and the need to adapt to nowadays' realities. Performance management can be done ethically, preserving the integrity of the organization, processes and individuals if it is not regarded as just a box checking exercise. That necessitates allocation of necessary resources, embeddedness of an outcome focused performance management approach into organizational culture and willingness coupled with action towards overcoming entrenched practices.

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EDUCATION AS COMPONENT OF A COMPREHENSIVE SECURITY APPROACH

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Abstract:
The aim of this paper is to demonstrate that education is the unifying foundation for all pillars of comprehensive security, including economic resilience, technological superiority, military readiness, and democratic cohesion. The paper examines the direct national security implications of declining educational standards, from recruitment crises in technologically advanced militaries to the erosion of civic literacy, which leaves nations vulnerable to disinformation and internal division. It concludes that fragmented, incremental reforms are insufficient. Instead, a deliberate, unified, and sustained national effort is required, built on a series of concrete policy recommendations. This paper makes the case for a fundamental reframing of education as a core national security investment, essential for securing a nation's future in an increasingly complex and competitive world.

Key words: education, comprehensive, security, approach, resilience,

1. Introduction

A robust and comprehensive education system, with an emphasis on fostering critical thinking, is not merely a component of national well-being but the foundational pillar of national security, essential for cultivating the cognitive agility, democratic resilience, and strategic adaptability required to navigate an increasingly complex and uncertain global landscape.

In 1957, the successful launch of the Soviet satellite Sputnik 1 sent shockwaves through the United States, igniting fears that the nation was falling behind its Cold War adversary in the critical arenas of science and technology. The American response was not primarily military; it was educational. The passage of the National Defense Education Act of 1958 signaled a national consensus: to secure the nation, America had to first educate its citizens. [1] This landmark legislation resulted in the allocation of unprecedented federal funding into science, technology, engineering, and mathematics (STEM) education, fundamentally reshaping American schools and universities. Over half a century later, we are faced with new, more complex array of global challenges, in which the information overload, the ubiquity of social media, the fast pace of the modern life and the emergence of artificial intelligence severely impact's people's ability to construct an accurate image of the reality and makes us vulnerable to malign influence. This influence may originate from commercial actors interested in our purchasing power, but also from state and non-state actors interested in influencing and controlling our minds, as part of cognitive warfare. In this context, once again, the effectiveness of the educational system in providing the population with the necessary tools to resist such influences has emerged as a paramount national security concern.

The very definition of national security has expanded far beyond the traditional military based approach, as in modern times a nation's security is measured not only by its battalions and battleships but also by the dynamism of its economy, the analytical prowess of its citizens, the resilience of its democratic institutions, and the strategic foresight of its diplomats. Economic competitiveness serves as the bedrock of national power, funding defense and enabling global influence. Technological superiority, particularly in fields like cybersecurity, artificial intelligence, and biotechnology, defines the modern battlefield. Meanwhile, internal social cohesion and a shared commitment to democratic values are the bulwarks against foreign disinformation and internal division, which have become potent weapons in the arsenal of modern adversaries. In this interconnected landscape, a well-educated citizenry is not a luxury; it is the central pillar supporting every one of these strategic imperatives.

This paper argues that an education system prioritizing the cultivation of critical thinking is the most vital component of modern national security. The failure to develop these core cognitive skills in the populace—from foundational instruction to advanced postgraduate research—directly undermines a nation's ability to innovate economically, adapt technologically, field an agile military, maintain social cohesion, and lead on the world stage. By examining the links between education and the core domains of national power, this analysis will demonstrate that investing in schools, universities, and students is a fundamental and effective long-term strategy for ensuring the security and prosperity.

2. Education as part of a comprehensive security approach

A nation's economic strength is not merely a source of funding for its military; it is a vital societal function and a cornerstone of a comprehensive security strategy, in a whole-of-society approach, ensuring the continuity of critical functions against a wide spectrum of threats, including economic coercion, supply chain disruptions, and cyberattacks on financial infrastructure. Comprehensive security is the result of the integrated and seamless synergy between several pillars: psychological resilience, effective leadership, a nation's military power, internal security, a reliable economy, security of infrastructure and supply chains and the functional capacity of the population and services. [2]

A nation's economic strength is not merely a source of funding for its military; it is a vital societal function and a cornerstone of a comprehensive security strategy. This modern security paradigm extends beyond traditional defense to encompass a whole-of-society approach, ensuring the continuity of critical functions against a wide spectrum of threats, including economic coercion, supply chain disruptions, and cyberattacks on financial infrastructure. In this context, economic resilience—the ability to anticipate, withstand, and adapt to such shocks—becomes a primary national security objective. This resilience is not built on infrastructure or capital alone; it is fundamentally dependent on the cognitive skills and adaptability of the nation's citizenry.

An educated populace, trained in critical thinking and complex problem-solving, is the most crucial asset for ensuring this *economic continuity*. While a traditional view emphasizes a skills gap in specific technical fields, a comprehensive security perspective reveals a more profound need for a workforce capable of analytical reasoning and creative adaptation. Such individuals can pivot between industries, innovate in response to resource scarcity, and develop novel solutions to unforeseen economic challenges. An education system that prioritizes critical inquiry prepares citizens to be active participants in a resilient economy, capable of collaborating across public, private, and non-governmental sectors to identify vulnerabilities and build redundancies. Economic resilience is built on a foundation of human capital and an educated workforce, populated by

engineers, logisticians, economists, and skilled technicians, is essential for designing, building, and maintaining critical infrastructure and secure supply chains. Beyond specialization, a general education that fosters critical thinking and adaptability allows a workforce to innovate in response to economic coercion or disruption, retooling industries and rerouting supply lines to ensure the continuity of the national economy.

The mobilization of all national resources during a crisis goes beyond the simple mobilization of civilian industry for wartime production, as it should include the population's *psychological resilience* and its ability to function cohesively under extreme stress. In the battlefield of information, where hybrid threats, disinformation, and psychological warfare aim to fracture societal trust and paralyze decision-making long before any physical conflict begins, the primary defense against such tactics is a citizenry educated to think critically. Such an education equips citizens to discern credible information from propaganda, to question narratives that prey on emotion and bias, and to understand the historical and cultural contexts behind geopolitical events. This is not a passive skill, but an active form of defense, acting as a vaccine that inoculates the public against manipulation and fosters the unity required for a collective response in a crisis. Educational disciplines often dismissed as "soft"—such as history, civics, philosophy, and media literacy—are, in fact, central to building this cognitive armor. They teach students to evaluate sources, recognize logical fallacies, and appreciate diverse perspectives, thereby strengthening the very fabric of social cohesion that adversaries seek to unravel. By shifting the educational focus from memorization to a culture of critical inquiry, a nation moves beyond preparing for conventional warfare and actively builds the intellectual and psychological resilience.

The whole-of-society coordination demanded by comprehensive security requires *leaders* who can navigate immense complexity and make sound judgments under pressure. Higher education in fields such as public administration, strategic studies, and international relations is crucial for developing this expertise, while at a more fundamental level, an education grounded in critical thinking and ethical reasoning cultivates leaders who can analyze multifaceted problems, anticipate cascading consequences, and inspire public trust during a crisis.

The *modern military* requires more than just technically proficient soldiers, it needs adaptable, critical thinkers. An educated military force is better equipped to operate sophisticated technological systems, make autonomous and ethical decisions in the fog of war, and develop innovative strategies to outmaneuver adversaries. From the non-commissioned officer on the ground to the highest levels of the Pentagon, the ability to think critically is the ultimate force multiplier.

The readiness and capability of a nation's military are directly and inextricably linked to the educational attainment of its population. In an era of complex, rapidly evolving threats, the traditional metrics of military power—such as the number of troops or the sophistication of hardware—are insufficient. The decisive advantage now lies in the cognitive abilities of service members at every level, from the front-line soldier to the strategic planner. An education system that fails to produce a sufficient pool of qualified recruits and that neglects the cultivation of critical thinking skills represents a direct threat to the development and sustainment of a nation's defense capabilities.

While there are no comprehensive European-wide statistics specifically tracking how literacy levels affect military conscription or recruitment, there is substantial evidence from multiple sources showing that low literacy and educational deficits are a significant barrier to military readiness in Europe. For instance, the numbers regarding the literacy level of army recruits in the UK for the period 2016-2019 are extremely worrying, with 4,240 soldiers having the reading ability of nine to 11-year-olds and fifty had literacy levels of a five to seven-year-old, in direct contravention of

established military rules [3], in the context of a decrease in the overall level of literacy in the European societies, with 18-28% of adults in major European countries having literacy levels incompatible with modern military service requirements [4]

A direct impact of this situation is that military commanders will have to work with soldiers who cannot read basic instructions, and many countries are experiencing unprecedented recruitment and retention crises.

The contemporary battlefield is characterized by ambiguity, information overload, and the need for decentralized decision-making. As such, the most critical attribute for a modern service member should not be blind obedience but disciplined initiative, the ability to make sound judgments and act decisively, even when orders are no longer applicable to the situation [5]. This requires a high degree of critical thinking, as military leaders at all levels must be able to analyze complex situations, identify biases in their own thinking, evaluate conflicting information, and anticipate the second- and third-order effects of their actions, given that "critical thought becomes an essential precursor to physical defense tactics, as uninformed action itself is a risk factor" [6] An education system that emphasizes problem-solving, analytical reasoning, and intellectual agility is therefore a direct contributor to combat effectiveness.

The development of future defense capabilities, from cyber warfare and artificial intelligence to space operations and logistics, is entirely dependent on a highly educated workforce. This goes beyond the uniformed military to include the civilian scientists, engineers, and technicians in the defense industrial base, with the higher education institutions as the primary engine for this talent, providing not only the specialized technical knowledge but also the broad, interdisciplinary perspective required for innovation. Professional Military Education (PME) and civilian graduate programs are essential for cultivating strategic leaders who can manage complexity, develop long-range plans, and ensure the military as an institution can adapt faster than its adversaries. Lifelong learning, through continuous professional dialogue, dedicated reading, and formal coursework, is no longer a personal development goal but a strategic necessity for maintaining a cognitive edge throughout a military career. [5]

A nation's internal security depends on a professional class of law enforcement, intelligence analysts, and emergency managers who can understand and mitigate complex domestic threats. Education in sociology, psychology, and data analysis allows these professionals to identify patterns of radicalization, de-escalate community conflicts, and manage crises effectively. Furthermore, a broadly educated and civically engaged populace is more likely to trust and cooperate with security institutions, fostering a safer society from the ground up.

A nation's security is not solely dependent on its ability to counter external threats; it is equally reliant on its internal strength and cohesion. A significant and growing threat to national security now comes from within, fueled by deep social and political polarization, the pervasive spread of foreign-led disinformation campaigns, and a tangible decline in shared democratic values. These internal divisions can be exploited by adversaries to weaken the nation's resolve, erode trust in democratic institutions, and paralyze decision-making, making a country vulnerable without a single shot being fired. In this context, a well-informed and engaged citizenry is the first and most crucial line of defense.

Civic education should not be viewed as an academic subject but a critical tool for building resilience against cognitive warfare and manipulation. By teaching the mechanics of government, the rights and responsibilities of citizenship, and the importance of critical thinking, civic education equips citizens to identify disinformation, engage in civil discourse, and maintain faith in the democratic process. It fosters a shared understanding of the nation's constitutional republic and the

values of tolerance and diversity that bind a pluralistic society together, thereby strengthening the social fabric against attempts to tear it apart.

The pillar of *ensuring the continuity of governance and of the essential services* is directly dependent on a sound education system, as a well-educated population is a healthier, more self-sufficient, and more capable population. This is related to health literacy, which is critical during pandemics and in order to resist manipulation, to financial literacy that contributes to a more stable personal funds management, to digital literacy which increases the resilience in the face of cyberattacks and disinformation, but also for ensuring the trust of the population in the authorities in case of crisis and the ability of the population to remain self-sufficient until the authorities can respond.

In an interconnected world, national security is inseparable from *global alliances and effective diplomacy*. An education system that emphasizes foreign languages, cultural studies, and international relations creates a cadre of diplomats, intelligence officers, and global business leaders who can navigate complex international environments, build trust with allies, and advance the nation's interests peacefully.

As the modern warfare and national security are increasingly defined by *technological supremacy*, the current and future battlefields are a complex, multi-domain environment where dominance in artificial intelligence, quantum computing, space, and cyberspace are as critical as traditional military capabilities. This technological reliance creates an urgent demand for scientists, engineers, and technologists, but also increases the need for enhanced education in this field for military personnel, across all levels of command. The increased use of the Emerging and Disruptive Technologies in the battlefield is recognized through the adaptations of doctrines (such as the shift from joint operations towards multi domain operations), but the doctrines need to be implemented and this cannot be done without a properly educated workforce.

3. Policy Recommendations and the Path Forward

The preceding analysis demonstrates that addressing these multifaceted challenge requires a deliberate, unified, and sustained national effort that moves beyond fragmented initiatives and treats education as the strategic imperative it is. The path forward for any modern state must be built on a series of concrete, actionable policy recommendations detailed below, which directly address the identified weaknesses in economic resilience, technological innovation, military readiness, civic cohesion, and global competence.

The first step for any government must be to establish a high-level, cross-sector National Security Education Council, comprising senior leaders from government ministries (defense, foreign affairs, education, and economy), private industry, academia, and the military and tasked with conducting a comprehensive audit of the nation's educational system through the lens of comprehensive security. Its mandate would be to identify critical deficiencies, establish clear, measurable national goals for educational attainment in key areas, and recommend a unified national strategy. This would elevate the issue to the highest level of government and create the political will necessary for sustained, long-term reform.

In order to build resilience against internal and external threats, a nation must rebuild its foundational educational capacity, based on 2 main pillars. First, the central government should create a framework that incentivizes regional and local authorities to adopt and implement robust, evidence-based standards for civic education, media literacy, and critical thinking. These standards should be treated as a national priority, encouraging the integration of critical thinking skills across

all subjects. This provides a first line of defense against the disinformation that erodes democratic cohesion and weakens the state from within.

Secondly, the recruitment crises observed in modern, technologically advanced militaries highlight that basic literacy is a non-negotiable prerequisite for any effective defense force or skilled workforce. National policy must address the root causes of declining literacy rates, supporting early childhood education and evidence-based reading instruction to ensure that every student graduates with the fundamental ability to read, comprehend, and analyze complex information.

Technological superiority requires a strategic and unified approach to STEM talent development. A government, in partnership with its defense and technology industries, should formally adopt and fund the creation of a nationwide network of regionally anchored technology education ecosystems. The paths forward refer to the creation of a central organization to provide national oversight and local bodies to manage regional efforts, ensuring alignment between educational institutions and the specific workforce needs of nearby military installations and high-tech industries, providing funding to scale proven public-private partnership models that integrate secondary school, higher education, and industry experience and offering tax incentives and preferential treatment in government contracting for firms that actively participate in these initiatives through mentorships, paid internships, and curriculum co-development.

Ultimately, the path forward requires a fundamental shift in the national mindset. Education must be reframed not as a social spending issue but as a core national security investment, as vital to a nation's defense as investments in advanced weaponry and cybersecurity infrastructure. The long-term costs of educational failure (brittle economy, a hollowed-out military, a divided populace, and a diminished standing in the world) are far greater than the cost of investing in schools, teachers, and students today. Securing any nation's future begins in the classroom, and the time for decisive, unified action is now.

4. Conclusions

This paper has argued that the security of a modern nation is inextricably linked to the quality and focus of its educational system. The analysis has demonstrated that education is not a peripheral social policy but the foundational pillar upon which all other instruments of national power are built. A nation that neglects the cognitive and civic development of its people is, in fact, practicing a form of unilateral disarmament. To allow educational standards to decline, to permit civic literacy to atrophy, and to ignore the cultivation of critical thinking is to cede the future to adversaries who understand that the most decisive battles of the 21st century will be won not on the basis of steel and firepower, but on the intellectual and psychological resilience of a nation's people.

Policymakers, educators, industry leaders, and the public must forge a new national consensus that recognizes education as the central pillar of a comprehensive security strategy. This requires more than just funding, demanding a strategic, unified, and sustained effort to rebuild the nation's educational foundations. Securing the future is a task that begins not in the war room or the factory, but in the classroom.

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THE IMPACT OF ARTIFICIAL INTELLIGENCE ON MILITARY EDUCATION AND TRAINING

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Abstract:

The rapid evolution of artificial intelligence (AI) and machine learning (ML) presents enormous potential in education. Military education and training require exploration of the integration of artificial intelligence into learning and training systems to improve educational results and military skills.

This article aims to analyze the current use of artificial intelligence, outline the benefits and challenges associated with its integration, and assess its impact on ethical aspects and responsibility. This paper provides a comprehensive analysis of the literature, focusing on relevant sources and current official documents issued by NATO, the European Union, and national institutions, in order to document the process of integrating artificial intelligence into the military domain.

Despite significant limitations, such as data protection problems and the complexity of artificial intelligence and machine learning systems, the results obtained highlight the potential of these technologies to profoundly transform educational processes by facilitating personalized training tailored to the individual needs of learners.

Key words: education; training; military exercises and evaluation; artificial intelligence; AI ethics; governance.

1. Introduction

Artificial intelligence (AI) is deeply transforming various sectors, and the military is no exception. As modern warfare becomes increasingly dependent on information, speed, and precision, the need for more intelligent, adaptive, and technologically integrated training systems in military institutions is more pressing than ever [12]. AI is a large class of software capable of performing functions similar to those of humans, such as problem solving, prediction, and learning. Today, when people talk about *"artificial intelligence"* they often refer to machine learning (ML), a subcategory of AI that develops its functionality by identifying patterns in data [24]. By leveraging the capabilities of artificial intelligence and machine learning, large volumes of data can be analyzed, patterns can be identified, and relevant information can be generated for both students and instructors. This process provides real-time feedback and allows educational content to be tailored to each learner's level of knowledge, learning pace, and cognitive style [13].

Some experts consider that artificial intelligence *"are to understand the phenomenon of human intelligence and to design computer systems that can mimic human behavioral patterns and create knowledge relevant to problem-solving"* [16]. The relevance of artificial intelligence in the military domaine is constantly growing, but its use must respect human values and ethical principles.

According to the report *Artificial Intelligence and the Future of Teaching and Learning: Insights and Recommendations* [6], significant progress has been made in integrating artificial

intelligence into education, which can provide a solid foundation for further developments. The authors emphasize the importance of a well-articulated public dialogue around three key questions [6]:

1. *What are the main opportunities and risks associated with the use of AI in education?*
2. *How can the development of safe and reliable educational AI solutions be ensured?*
3. *How can the algorithmic models behind AI applications be understood so that they reflect qualities aligned with the values and objectives of educational systems?*

These lines of reflection are essential for building an ethical, effective, and equitable framework for the use of artificial intelligence in education.

The general objective of this article is to highlight the importance of applying artificial intelligence in military education and training, with a focus on the concrete benefits that these technologies can bring in streamlining the learning process and continuously adapting military personnel to the demands of a rapidly evolving technological battlefield.

This article also examines the potential, limitations, and future prospects regarding the ethical and governance considerations of integrating artificial intelligence into the military education system, highlighting the need for a balanced approach aimed at optimizing technological advantages and minimizing associated risks.

An objective remark is that it is recognized *"the need for a balance between leveraging AI's potential benefits in military operations while upholding moral and legal standards. The inclusion of these ethical principles serves as a foundation for responsible and accountable use of AI in the complex and dynamic landscape of military scenarios"* [1].

Research methodology. In this article, the research methodology was based on a qualitative-descriptive method, grounded in the examination of specialized literature, strategies, and plans regarding AI in the military domain from various organizations and developed countries, as well as educational policies implemented in various military institutions. The research also analyzed concrete examples of countries that have successfully regulated artificial intelligence in training and education activities.

Content analysis was used to identify the main benefits of using AI, but also to highlight the difficulties, limitations, and possible ethical risks generated by the application of this technology in the area of military education and training.

The research results demonstrate that integrating artificial intelligence into military training offers a number of notable advantages. These include more efficient training through the use of intelligent simulations, tailoring educational content to each trainee's profile, and more efficient management of large volumes of data. However, the application of AI also involves certain risks, such as increased dependence on technology, possible breaches in the protection of sensitive data, and a decline in the development of fundamental military skills, which are formed through direct practical experience.

2. Benefits and Opportunities of Artificial Intelligence in Military Education and Training

Artificial intelligence offers substantial potential to improve the quality of military education, bringing significant advantages in various areas of application. A key benefit is the increased efficiency of the training process and the expansion of large-scale application capabilities, as AI can take over certain tasks from teachers and training staff, such as ***automatic training and testing***,

making processes more efficient.. For example, *"AI can support adaptive learning (also called personalized learning) where AI monitors a person (or team) and then offers recommendations based on their characteristics and behaviors"* [24].

Artificial intelligence has the potential to take over a number of repetitive and administrative tasks from teachers and training staff, such as automating teaching and assessment processes, thereby contributing to increased efficiency and optimisation of human resources. In particular, Generative AI offers advanced capabilities for the rapid development of educational materials, including the automatic generation of tests, study programs, and tailored teaching content. It can transform teaching materials into structured ***e-learning modules*** and provide personalized feedback and evaluations for participants based on rubrics set by instructors. In the domain of military training, Generative AI enables the creation of a wide range of realistic simulation scenarios, facilitating the exposure of personnel to varied operational situations and thus contributing to the development of decision-making capabilities and resilience in conditions of uncertainty. [24].

Autonomous weapon systems represent a significant advance in military technology, operating without direct human intervention. Beneficial military applications include intelligent decision support systems and assisted target recognition, which can reduce the mental load on operators, enabling more rapid decision-making [23]. This approach offers advantages such as rapid response times, the ability to operate in high-risk environments, and reduced danger to human personnel [2]. ***Training in the use of artificial intelligence*** is becoming essential for military personnel because they need to familiarize themselves with the technology required to operate, understand, and/or neutralize these systems. Integrating AI into military education not only facilitates the effective use of these technologies on the battlefield, but also contributes to the development of a critical attitude towards potential vulnerabilities, limitations, and associated risks.

Artificial intelligence can provide organizations with in-depth information on the level of preparedness of military personnel, thus contributing to informed decisions on training and resource allocation. By analyzing a wide range of data from individual trainees, teams, or subunits, AI enables a more accurate assessment of the state of preparedness. For example, artificial intelligence can integrate and analyze data such as test results, physical behaviors recorded by video systems during practical exercises, and instructor observations. Based on these sources, AI can ***generate predictive models*** that estimate the readiness of a soldier, team, or subunit in relation to established tasks.

Wargames are also an essential method in military education and training, providing a safe environment for testing courses of action, improving decision-making, and exploring complex scenarios without the direct consequences of actual conflict. These simulations are not intended to accurately predict future conflict, but rather to develop the ability to adapt to uncertainty [4]. In this context, the integration of generative artificial intelligence opens up new perspectives for the evolution of war games. Recent experiments demonstrate that AI can contribute significantly to increasing the realism of simulations, automatically generating complex scenarios, modeling the behavior of the actors involved, and providing real-time decision support.

Another key benefit of artificial intelligence in military education is the integration of ***virtual reality*** (VR) technology into tactical training programs. Through VR, military personnel are introduced to virtual, realistic, and dynamic combat environments that reproduce complex operational conditions. This form of training facilitates intensive experiential learning, enabling the rapid development of reaction, decision-making, and coordination skills in high-stress situations, in a controlled and safe environment [14]. The integration of artificial intelligence and virtual reality technologies into military education and training not only optimizes the learning process through realistic and adaptive simulations, but also provides a training environment that reflects the

complexity and unpredictability of real combat situations. In this way, military personnel acquire combat skills, develop their ability to react in dynamic environments, and are better prepared to face the challenges encountered in theaters of operations.

Furthermore, AI-assisted learning ecosystems enable ***learning analytics***, helping to identify capability gaps, anticipate future military performance, and assess overall force readiness. Thus, artificial intelligence becomes an essential tool in optimizing training processes and supporting decisions regarding the training of human resources in the military.

Artificial intelligence is integrated into the ***C4ISR system*** to support combat units by automating difficult tasks and providing decision support in war scenarios. Proper training and education enable military personnel to understand, use, and optimally leverage AI capabilities, particularly in terms of data fusion and analysis. Thus, artificial intelligence, combined with well-trained personnel, significantly increases the ability to collect, process, and exploit information, providing analysts with more accurate warnings and powerful tools for decision-making and more reliable intelligence analysis [27].

To address the current challenges associated with the implementation of artificial intelligence and to move toward concrete measures, Chmyr and Bhinder proposed five strategies that could beneficially influence higher military education through AI technologies, as follows [7]:

- *incorporate AI in curriculum* - the integration of AI content and applications into military educational programs;
- *develop AI digital competency* - training students and teachers in the effective use of AI technologies;
- *develop regulations when using AI within the educational process* - establishing explicit guidelines for the responsible application of AI in education;
- *develop AI-based methodology* - adapting teaching processes using AI tools and solutions;
- *increase teacher's innovative competency* - stimulating creativity and openness among teachers towards new technologies.

According to the same authors, the most common uses of artificial intelligence in education include: e-learning platforms, educational games and simulations, assessment tools, personalized learning systems, learning management platforms, and data analysis.

3. Ethical and Governance Considerations

The rapid development of artificial intelligence-based technologies in the field of defense has outpaced the pace of adaptation of the legal and regulatory framework. This lack of synchronization has raised concerns internationally, prompting numerous calls for the development of uniform regulations and firm ethical principles to ensure the responsible and controlled use of AI in military applications.

Although the benefits of integrating AI into military education are numerous, there are also significant challenges and risks that require careful management.

To ensure safe and effective use, artificial intelligence systems must be transparent in their decision-making, and their implementation must be accompanied by adequate user training. Users must understand both how these technologies work and their limitations in order to prevent potentially dangerous errors. In sensitive areas, such as the military or medical fields, a problem of

responsibility may arise, as operators or professionals do not exercise direct control over the decisions generated by generative AI systems [23].

A correctly informed perception of the use of artificial intelligence in training and learning processes is essential because, in a democratic society, the public can directly and indirectly influence developments in the field of AI *"driven by inaccurate narratives and conspiracy theories and (mis)information presented on social media"* [15].

According to some experts, the challenges in integrating AI into military education are [12]:

- *data security and privacy:* The use of artificial intelligence in military education involves major risks to the security of sensitive data. Protecting this data from cyber attacks and unauthorized access is essential, and AI systems must be rigorously secured to prevent the compromise of information or the training process;

- *high costs of implementation:* budget constraints, especially in developing countries, can limit the adoption of AI solutions. Ongoing expenses for updates, security, and technical support accentuate the challenge of balancing innovation with financial sustainability;

- *technological infrastructure limitations:* the lack of reliable technological infrastructure limits the effectiveness of artificial intelligence systems in military education. Effective AI integration depends on advanced technological infrastructure, including high-speed networks, cloud computing, and advanced processing units;

- *overdependence on AI and skill degradation:* excessive use of artificial intelligence-based systems risks leading, over time, to an erosion of critical thinking, leadership, and decision-making autonomy. These abilities are essential in operational contexts marked by uncertainty, pressure, and urgency;

- *ethical and legal concerns:* Training in sensitive areas such as autonomous weapons or cyber warfare involves complex moral dilemmas. To comply with international laws and military codes, strict governance and careful oversight are essential.

In most countries, the ethical issues and responsibilities associated with the use of artificial intelligence in the military sphere have been treated with increased attention. Authorities have recognized the importance of establishing clear principles to guide the development and application of these technologies in accordance with moral and legal norms. The use of artificial intelligence in the military must comply with international humanitarian law and be conducted in a responsible, transparent, and appropriately human-controlled manner. They recommend conducting legal reviews, ensuring rigorous oversight, properly training staff, thoroughly testing systems, and adopting measures to reduce risks, errors, and associated biases [32].

Continuing this scientific paper, I will present the main reference documents regulating the use of artificial intelligence in the defense sector, as formulated in the legislative framework of representative organizations and states. This necessity for regulation has been recognized by several international organizations. The United Nations (UN), through the Group of Governmental Experts on Emerging Technologies in the Area of Lethal Autonomous Weapons Systems [30], has initiated debates on banning or limiting the use of AI in lethal weapons, calling for significant human control to be maintained in lethal decision-making.

The European Union has also emphasized in its Regulation laying down harmonized rules on artificial intelligence [10] the importance of developing artificial intelligence systems that are consistent with European values. Within the EU, particular emphasis is placed on the principles of

transparency, accountability, and respect for fundamental rights, including in military applications [11].

Countries are focused on getting the technological edge in artificial intelligence to boost their competitive advantages in areas like military capabilities, economic productivity, and technological progress. In this context, NATO member countries have paid special attention to emerging and disruptive technologies that can be used in defense, as well as the challenges that come with innovation in this sector. NATO adopted its first *Artificial Intelligence Strategy* in October 2021 [19], and a revised version of this strategy was launched at the Washington Summit in July 2024 [20].

USA. The Department of Defense has classified artificial intelligence as a technology with disruptive potential for defense and has included it among the critical technological capabilities that require investment and priority attention. AI, together with machine learning and autonomous systems, is seen as a catalyst for innovation in the military domain, contributing to the development of systems that can support combatants by improving the speed, quality, and accuracy of decision-making in the field. These are key factors in gaining an operational advantage that can deter or ensure success in a conflict [26].

The main documents regarding AI regulation in the US civil and military sectors are:

- DOD Directive 3000.09 Autonomy in weapon systems 2012, revised in 2023 [32];
- DOD Adopts Ethical Principles for Artificial Intelligence [33];
- U.S. Department of Defense Responsible Artificial Intelligence Strategy and Implementation Pathway [34];
- America's AI Action Plan, 2025 [35].

The ethical principles governing artificial intelligence are based on five essential values, which include [33]:

- *responsible:* Using AI systems responsibly means people need to use good judgment and be responsible when developing, implementing, using, and getting results from these systems;
- *equitable:* reducing as much as possible the occurrence of errors or unintentional biases in artificial intelligence systems;
- *traceable:* artificial intelligence capabilities will be developed and implemented in such a way that relevant personnel have an adequate understanding of the technology, development processes, and associated operational methods. A key aspect of traceability is transparency, which allows the human user to understand not only the result, but also the process by which it was obtained;
- *reliable:* AI-based capabilities will have clearly defined uses, and their safety, security, and effectiveness will be verified and ensured throughout their entire lifecycle;
- *governable*: Artificial intelligence systems will be designed and developed to perform their intended functions, identify and avoid unintended consequences, and allow for deactivation or interruption of operation in the event of unforeseen behavior.

UK. In the context of the 2025 Commanders' Conference organized in Athens, an event that brought together military leaders and specialists from the member states of the North Atlantic Alliance, discussions were dedicated to the prospects for the development of professional education in the defense and security domain. On this occasion, Major General Peter Rowell, commander of

the United Kingdom's Defense Academy, noted that: *"Artificial Intelligence will transform education. It was great to be with so many allies and partners to discuss how we can lead the way"* [9].

Some of the reference documents on IA regulation:

- Defence Artificial Intelligence Strategy [29];
- British Army's approach to artificial intelligence - A guide to accelerate the Army's adoption of AI and get the Army AI ready [5].

The main idea of the defense documents emphasizes the institutional commitment of the armed forces to the ethical, transparent, and efficient use of artificial intelligence, so *"the Army is a trusted and responsible user of AI, integrating human-centred AI across the whole force for decision advantage"* [5].

France. The French military strategy on artificial intelligence, called *Artificial Intelligence in Support of Defense* [25], clearly highlights concerns about ethics and responsibility, which are explicitly addressed in the concept of *"controlled artificial intelligence"* which involves maintaining active human oversight of automated processes. In support of this approach, a *Defense Ethics Committee* was created with an advisory and monitoring role. Among the most relevant contributions of the Defense Ethics Committee within the Ministry of Armed Forces are two key initiatives:

- Opinion on the Augmented Soldier [17];
- Opinion on the Integration of Autonomy into Lethal Weapon Systems [18].

Romania. It actively joins NATO and European Union initiatives on defense digitization and strengthening emerging capabilities, areas in which artificial intelligence plays an essential role. These efforts are not limited to modernising training and education processes in military education, but also aim to strengthen institutional resilience and increase the capacity to respond to new types of hybrid and cyber threats in an integrated manner. In support of these objectives, Romania has adopted a series of strategic reference documents, such as:

- National Strategy on Artificial Intelligence 2024-2027 [21];
- National Strategy for the Development and Support of Digitalization through Digital Innovation Centers in Romania 2024-2027 [22].

Romania places special emphasis on developing these capabilities, so that the National Strategy for Artificial Intelligence 2024-2027 *"constitutes a necessary and timely reference point for preparing Romanian society to understand, accept, and capitalize on the transformative processes generated by artificial intelligence"* [21].

An example of the integration of artificial intelligence in military education is within the *Center for Modeling and Simulation of Military Actions* and the *Robotics and Artificial Intelligence Laboratory* (CUB) at the Land Forces Academy, which uses modern modeling and simulation equipment and state-of-the-art software, such as VBS3 and VBS4, for researching and experimenting with the battlefield in virtual reality, thus contributing to the development of cognitive skills within the military training component of Land Forces students [3].

In an environment of increasingly complex and technologically advanced global security, governance and ethics in the use of artificial intelligence are becoming essential components of the process of integrating this technology into defense and military education. NATO and the European Union agree on the need for clear, transparent, and responsibly constructed regulatory frameworks to ensure that AI is used in accordance with democratic values, international law, and human rights principles. This framework is all the more relevant in military education and training, where

decisions made with the support of AI must be constantly subject to critical evaluation and human accountability.

Although artificial intelligence offers multiple benefits, its unsupervised or abusive use can compromise the quality and integrity of research. *Taylor and Francis*, one of the world's leading academic publishers, points out that AI-based studies can introduce errors, biases, or inconsistencies, manipulate content and citations, and generate false material such as deepfakes or synthetic text [28].

4. Conclusions

The integration of artificial intelligence-based technologies into military education and training is a transformative endeavor with significant implications for the effectiveness of military training and the ability of armed forces to adapt to current and future challenges. The use of intelligent tutoring systems, adaptive learning environments, and realistic AI-assisted simulations contributes to the individualization of the educational process and to improving the quality of instruction and training by optimizing decision-making and leveraging complex data analysis in real time.

The process of modernizing the armed forces, including education, requires the integration of innovative technologies into an effective system of collaboration between the military and technology, with the aim of optimizing operational performance and reducing existing deficiencies. However, the use of artificial intelligence in this context raises significant challenges related to the balance between human control and system autonomy, as well as the financial and technical feasibility of developing, maintaining, and operating these advanced capabilities.

The continuous development of human capital is a fundamental requirement. Professional training programs for teachers, military personnel, students, and other relevant actors must facilitate a thorough understanding of the mechanisms, opportunities, and limitations of artificial intelligence. Only through systematic training tailored to the digital context can skills remain relevant in the era of emerging technologies.

I consider that the application of artificial intelligence in education differs from one discipline to another, as the adoption of these technologies depends on the individual decision of instructors, often influenced by the lack of a legal framework and dedicated methodologies. However, where AI tools are integrated, they contribute significantly to the diversification of educational resources and to improving the quality of the teaching-learning process.

For a significant period of time, there has been a transition to the *"era of artificial intelligence"*, a context that requires a reassessment of approaches to digital education. Given the rapid pace of technological progress, separating learners from digital tools is becoming an unrealistic and ineffective approach to learning. The implementation of e-learning solutions in military education and training is characterized by short modules, concentrated content, increased flexibility, and the possibility of adaptive learning.

In the long term, educational and defense policies must focus on creating a framework of trust in the use of AI, anchored in social perceptions and respect for democratic values. Hybrid training models, which combine the efficiency of AI with human analytical capacity and responsibility, are emerging as sustainable solutions for modernizing military education in the context of future security.

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The 20th International Scientific Conference
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HOW THE EUROPEAN WHITE PAPER OF DEFENSE CAN RESHAPE DEFENSE POLICIES IN THE EUROPEAN UNION

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Abstract:
Due to current existing risks and threats the European Union has taken a major leap in terms of closing defense strategic capability gaps. It means to do so by record allocations for the European defense industry while also accelerating the transformation of the entire landscape of defense. For many European nations, defense planning and policies through capabilities development have meant the solitary use of the NATO Defense Planning Process. By analyzing, the European White Paper of Defense it is the aim of this paper to try and analyze how the EU's defense strategy will match NATO's agenda and how far can an organization like the European Union develop defense driven objectives that correlate with the needs of its member states.

Key words: defense industry, defense expenditures, defense policies, defense marketplace

1. Introduction

The European Defense White Paper – Readiness 2030 represents a milestone in the EU's strategic planning doctrine. This step further deepens the efforts that the European Union has made on defense policies, starting in 2016 with the Common Security Defense Policy. However, unlike previous documents focused primarily on capability development or industrial policy, this White Paper integrates geopolitical, operational, technological and financial dimensions into a coherent strategic narrative.

The need for such a document is fundamental, as it emerges in a moment of profound systemic instability, marked by the erosion of the post–Cold War security order, the resurgence of great-power competition, and the intensification of hybrid and non-linear conflict dynamics. Because of this, Europe's decision to develop the Re-ARM program, an integrated European response to a completely new set of risks and threats is a welcomed one. [1]

In the following chapters, we want to further contextualize the desired effects that can be highlighted from the new White Paper of Defense in order to understand ways ahead for European countries, be it they are part of the European Union or NATO.

2. Strategic Context of European Defense

The strategic context shaping EU defense policy starting with 2025 and continuing to 2035 and beyond is defined by acknowledging overlapping and mutually reinforcing crises. The biggest is the Russian Federation full-scale invasion of Ukraine. This illegal invasion represents the most consequential war on the European continent since 1945, challenging core assumptions of the

European security architecture. Simultaneously, China's rise and development on several critical economic unique domains, US strategic and political rebalancing, and the militarization of space, permanent cyber escalation, irregular migration flows, and the destabilization of neighboring regions increase the overall volatility of the European environment. [4]

The White Paper came as a need for the EU to re-conceptualize its understanding of the deterrence concept, as well as further develop its resilience and collective action within a multidimensional threat ecosystem that is further evolving. In this chapter we are going to further breakdown the main areas of interest in terms of where EU security can be improved. [8]

2.1. Evolution of the EU Defence Framework

EU defense policy has evolved from declaratory ambitions in the CSDP to actual, institutionalized mechanisms that are going to be put into motion to further strengthen European cooperation in the field of security and defense. . The Common Security and Defense Policy (CSDP) was indeed the first document at European level dedicated to defense policies but it was followed by other initiatives like PESCO (Permanent Structured Cooperation) , EDF (European Defense Fund) and CARD (Coordinated Annual Review on Defense). [9] All of these represent incremental but transformative steps that have lead the European Union to further increase its defense ambition and posture. [3]

A critical step was the full scale invasion of Ukraine by the Russian Federation in 2022 February 2022. The post invasion convergence among member states has accelerated defense coordination, joint procurement and operational interoperability. [10]

As it can be seen in **Figure 1** starting with 2022 the willingness of member states to spend more on defense has increased significantly and for the first time in a long number of years, the European states of NATO have started to become a bigger contributer to defense through their national expenditures, that started evolving beyong the 2% threshold.

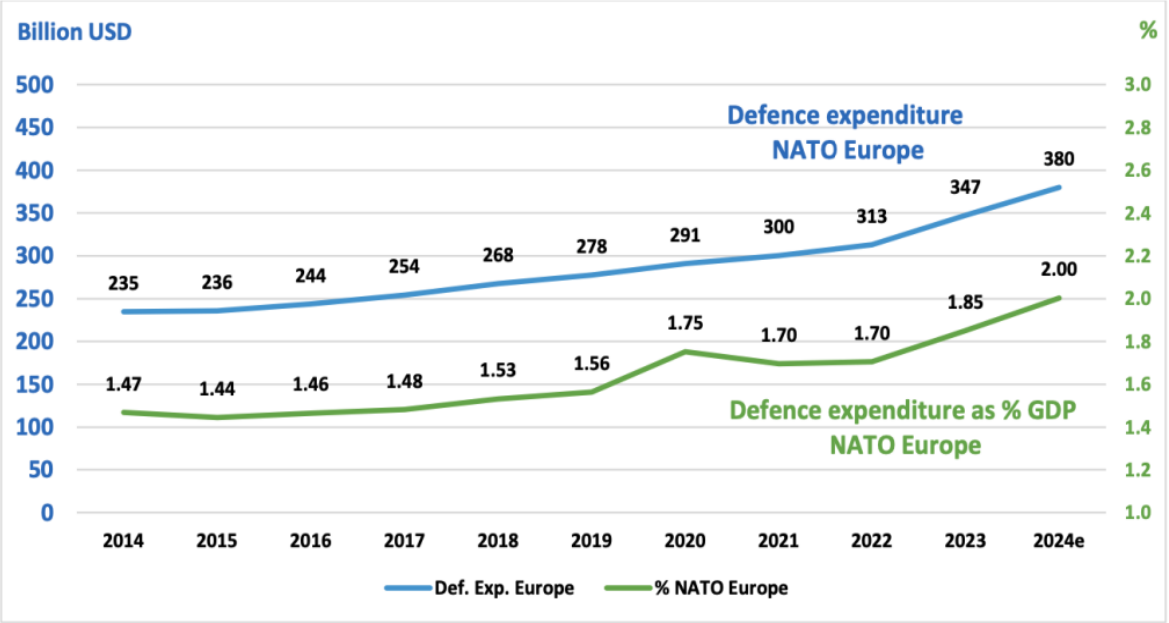

Fig.1 (Defense expenditures for NATO countries 2014-2024) [11]

2.2. Multidimensional Threat Landscape

While the financing of defense has started to exist after 2022, the legislative premises around the actual investments in defense needed to be created. The development of the White Paper of

Defense meant to first understand what are the actual risks and threats for security and defense at European level. In this context, it become obvious that the threat landscape confronting the EU is unprecedented in its simultaneity and complexity.[3] Conventional military threats coexist with hybrid operations, disinformation campaigns, cyber intrusions, terrorism, economic coercion and space-based hostile actions.

The decision was therefore to create a multi-domain operational document, based on a complex analysis that shows how adversaries exploit grey-zone tactics, target societal vulnerabilities and leverage technological asymmetries. The document also took into consideration the diffusion of emerging technologies such as AI-enabled kinetic systems, autonomous weapons, bio-threats and quantum capabilities.[6]

2.3. Priority Capability Areas of Readiness 2030

After its conception, the European Commission managed to identify in The White Paper seven critical capability areas requiring accelerated investment:

1. Air and missile defense
2. Artillery systems
3. Ammunition and missiles
4. Drones and counter-drone systems
5. Military mobility
6. Ai, quantum, cyber & electronic warfare
7. Strategic enablers and critical infrastructure protection

All of this critical capability areas mean different levels of investments and acquisition from national states that are willing to develop their capabilities for any one of the priority domains. Looking at the 7 areas in becomes clear that first and foremost there exists a technological gap that can only by filled by using heavily specific investments.

An observation must be made that while direct acquisition is required in order to further increase the modernization of European armies with new equipment, another indirect expenditure will come from the need to improve infrastructure corridors at European level in order to solve the issues with some of the priority area points like military mobility and critical infrastructure protection.

3. Defense Industrial Transformation and the SAFE Mechanism for EU and NON-EU Member States

In regards to the modernization of European armies through the acquisition of new equipment, the plan is to revamp the European defense industry, especially that of EU member states, while collaborating with the industry of other NATO member states like the US and UK.

Europe's defense industrial base is characterized by fragmentation, underinvestment and duplicative structures. The White Paper's proposal for a unified defense market and the SAFE (Security Action for Europe) mechanism marks a fundamental shift toward integrated production, cross-border industrial ecosystems and strategic supply-chain resilience. SAFE can be seen as a boost for the European Defense Industry, as 65% of each project financed through the instrument has to use the industry of one of the EU states.

3.1. Defense Financing and Investment Requirements

The European defense funding gap—estimated at over EUR 500 billion by 2030—raises questions of allocation, burden-sharing, and fiscal sustainability. To try to answer the existing

challenges, there have been many proposals at EU level including using different funding models like national budgets (get to NATO's 5% allocation requirement for defense), EU-level instruments (grants and EU Banks), joint procurement for member states, debt-financed programmers and hybrid public-private structures. Some of these types of funding are already going to be put into action through the Re-ARM Europe Program, using mechanisms like SAFE that are set to replace the previous common funding projects like PESCO.

3.2. Preparing for High-Intensity Conflict Scenarios

Readiness for high-intensity conflict requires robust logistics, rapid mobilization, resilient infrastructure and interoperable command structures. The European Union is already developing its own defense capabilities, establishing peace mission on the European Continent, in Bosnia and Herzegovina as well as in the African Continent in countries like Central Africa. [5] The potential for emerging conflicts will mean a modified posture for many of the existing capabilities, that could see an enhanced defensive role, once the personnel is deployed in other vulnerable areas around the EU borders.

3.3. Ukraine's Role in the European Security System

Ukraine is positioned as a strategic buffer, industrial partner and frontline defender of the European continent. Its relationship with the EU, especially on defense policies is undeniable. Currently the EU has the possibility of releasing almost 300 billion Russian frozen assets into Ukraine's economy, assets that could also be used to further strengthen Ukraine's deterrence posture.

Another significant element lies in the path to Ukraine's EU ascension as a full member. If that were to happen, Ukraine would fully benefit from the European Union's defense policies as they are described in the 2025 White Paper of Defense. Even without this accession there are multiple structural plans for potential capabilities that would enhance European deterrence through collaboration between Ukraine and the EU.

3.4. Implications for Romania

Romania's geostrategic relevance has significantly increased, given its position on the Eastern Flank and proximity to the Black Sea. For Romania, ReARM Europe and mechanisms like Safe represent an opportunity to develop its national defense industry, readjust and upgrade its defense capabilities while undergoing structural changes in order to build a modern military, a long term process that could take up to 2040.

Romania's willingness to be an integrated part of the new defense concept developed through the White Paper of Defense is visible through the development at national level of the new National Security Strategy () that is supposed to become a guidance document for the Romanian state on many layers that oversee security and defense. One particular chapter is the integration of the SAFE allocations, around 16.5 billion Euros for Romania into defense acquisition projects as well as infrastructure development for military mobility. The A7 and A8 highways that connect the historical regions of Romania with Ukraine and the Republic of Moldova are part of this process.

4. Conclusions

The European Defense White Paper marks a major strategic inflection point. It signals a shift for European mindset from a reactive posture to proactive defense planning, from fragmented industrial policies to integrated ecosystems, and from political caution to strategic engagement.

Several challenges could still emerge in the areas of EU defense governance, capability development, and geopolitical adaptation.

The path that the EU has chosen to take is a complicated by vital one. European autonomy in defense is crucial for securing the continent, enhancing joint efforts, reducing fragmentation and redeveloping the national defense industry become vital steps into what might evolve with future efforts into an integrated and unified European Army. [2]

While this particular concept is still far away from any authentic development, the existence of a White Paper of Defense postulates the clear ambition of EU member states to defend in front of existing and emerging aggressions, representing an intermediate step in a full deterrent capacity.

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DEFENSE RESOURCE PLANNING CHALLENGES IN THE CURRENT SECURITY ENVIRONMENT

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Abstract:
Modern defense resource planning faces unprecedented challenges driven by rapid technological change, shifting geopolitical dynamics, and evolving societal norms. This paper examines four critical dimensions shaping defense planning in the 21st century: human capital, economic constraints, technological integration, and logistical complexity. It highlights how traditional military structures and planning models are increasingly misaligned with the demands of contemporary security environments, including hybrid warfare, cyber threats, and multi-domain operations. The analysis emphasizes the urgent need for adaptive, agile, and innovation-driven strategies to ensure military readiness and strategic advantage. By exploring these interconnected challenges, the paper offers insights into how defense institutions can evolve to meet future security demands in a complex and uncertain global landscape.

Keywords: *reusource plannig; challenges; oportunities; readiness; strategic advantage.*

Introduction

The 21st-century era of rapid technological development and world power shifting changed our understanding of war, security and their dimensions. Defence and security are not only superiority in the land, sea and air domains it is beyond that. In today's globalization and technological rapid expansion multiplied security and defence dimensions, each represented a domain where conflict can unfold. These warfare domains are interconnected and often used simultaneously in hybrid strategies. This contemporary security environment is marked by complexity, unpredictability, and rapid changes, which demands strategic foresight, adaptability, and resilience from Defence organisations. Rising tensions among major powers, regional conflicts, and the resurgence of great-power competition mark the current international landscape. Conflicts such as the Russia-Ukraine war, Indo-Pacific tensions, and Middle East instability strain existing defence postures and create unpredictable scenarios that require rapid response capabilities. Defence resource planning is the process of aligning available assets—human, financial, technological, and material—with strategic objectives to ensure military effectiveness. Defence planners must anticipate diverse scenarios—from conventional warfare to grey-zone operations—and allocate resources flexibly. However, in an era of constrained budgets, cyber warfare, and global supply chain disruptions, this process has become increasingly difficult.

This paper examines the primary challenges in defence resource planning and management, focusing on human capital, economic constraints, technological integration and logistical complexities. As hybrid threats become more prevalent and strategic uncertainty increases, traditional resource planning models must adapt to ensure operational readiness and strategic advantage.

1. Human Capital

Skilled human resources are central to defence effectiveness, particularly in domains like cyber, data analysis, and unmanned systems. However, many militaries struggle to recruit and retain the talent necessary to operate and innovate within these domains. Defence organizations compete with the private sector for high-tech talent, often offering less attractive career paths and compensation. Moreover, outdated personnel policies and rigid hierarchies hinder agility and innovation. According to several studies, military recruitment across numerous nations is increasingly caught up by four major factors, demographic shifts, societal attitudes, technological advancements and cultural factors.

1.1. Demographic Shifts

- Health Issues: Many potential recruits are disqualified due to physical or mental health concerns. In the U.S., for example, obesity, drug use, and mental health diagnoses disqualify over 75% of youth aged 17–24.
- Educational Deficiencies: Declining literacy, numeracy, and overall academic performance reduce the number of candidates eligible for roles requiring basic or technical proficiency.
- Aging Populations: In countries like Japan and Germany, shrinking youth populations due to low birth rates are limiting the military-age demographic.
- Urbanization: More youth in urban areas are disconnected from military culture, which is often more prevalent in rural or traditional communities.

1.2. Societal Attitudes

- Erosion of National Identity: Many younger citizens express a weaker sense of national duty or patriotic motivation to serve, especially in Western democracies.
- Perceived Irrelevance: Some view the military as outdated or disconnected from modern, tech-driven career aspirations.
- Public Trust Deficit: High-profile incidents of misconduct, the politicization of the military, or controversial deployments have led to growing public scepticism and reluctance to support military service.
- Competing Civilian Opportunities: Skilled candidates are more likely to choose lucrative private-sector jobs over military careers, especially in fields like engineering or IT.

1.3. Technological Advancements

- Changing Warfare Landscape: Modern conflicts increasingly involve cyber warfare, unmanned systems (drones), space operations, and AI-based surveillance—requiring highly technical personnel.
- Skill Shortages: Armed forces must now compete with the tech industry for experts in cybersecurity, coding, machine learning, and data science.

- Training Gaps: Traditional military training pipelines are often too slow or outdated to produce cyber-ready professionals at the pace needed.
- Integration Challenges: Adapting command structures and recruitment models to accommodate tech-savvy specialists without traditional military backgrounds remains difficult.

1.4. Cultural Factors

- Workplace Environment: Reports of hazing, sexual harassment, racism, and toxic leadership have damaged the reputation of military service as a safe or equitable career.
- Inclusion and Diversity: Many militaries are struggling to attract recruits from minority or underrepresented communities due to historical exclusion or lack of targeted outreach.
- Retention Issues: Even when individuals join, many leave early due to dissatisfaction with career progression, work-life balance, or family support systems.
- Generational Expectations: Younger recruits often seek flexibility, purpose-driven work, and respectful leadership—expectations that clash with hierarchical, rigid military cultures.

In conclusion, as a new generation joins the military ranks, defence structures face challenges related to technological expectations, work-life balance, diversity, purpose, and communication styles. By adapting to these challenges, the military can create an environment that attracts and retains this generation of service members. Embracing technology, promoting inclusion, and fostering a culture of purpose will not only enhance recruitment efforts but also ensure a more resilient and effective defence force for the future.

2. Economic constrains

National defence spending has traditionally occupied a central place in government budgeting, often justified by the imperative of maintaining security, sovereignty, and geopolitical influence. However, contemporary economic realities have introduced significant constraints to defence budgets, especially after the end of the Cold War European countries significantly decried defence spending. These constraints are shaped by a combination of competing domestic priorities, global economic volatility, and the increasing financial demands of technological modernization. It has to be underlined that the COVID-19 pandemic left most governments with unprecedented debt levels due to stimulus packages, emergency spending, and revenue losses. This financial squeeze complicates medium- and long-term planning in the defence sector, particularly for states with smaller economies or weaker fiscal foundations.

Modern warfare increasingly demands advanced technologies, including cyber defence systems, hypersonic missiles, space-based sensors, and autonomous platforms. The costs associated with these systems are immense, often surpassing traditional weapons platforms in both acquisition and lifecycle maintenance.

These economic constraints have several implications for defence strategy and operational readiness such are:

- **Capability Gaps:** Nations may struggle to maintain full-spectrum capabilities, leading to over-reliance on allies or contractors.
- **Delayed Modernization:** Lagging in technological adoption may reduce deterrence and operational effectiveness.
- **Reduced Global Influence:** Budget limitations may hinder a country's ability to project power or participate meaningfully in multinational operations.

- **Vulnerability to Asymmetric Threats:** Adversaries may exploit gaps created by fiscal constraints, especially in areas like cyber and space.

Economic constraints have become a defining feature of contemporary defence budgeting. While national security remains a paramount concern, it must now be balanced against a complex array of domestic and international economic pressures. Only after Russia's full-scale invasion of Ukraine, some European countries start to reprioritize the defence budget and allocate more funds to it (Fig.1). To navigate this environment, governments must pursue smarter, more efficient approaches to defence spending—emphasizing cost-effective innovation, collaborative development, and transparent procurement practices. Only through such reforms can defence establishments remain capable and credible in an increasingly unpredictable world.

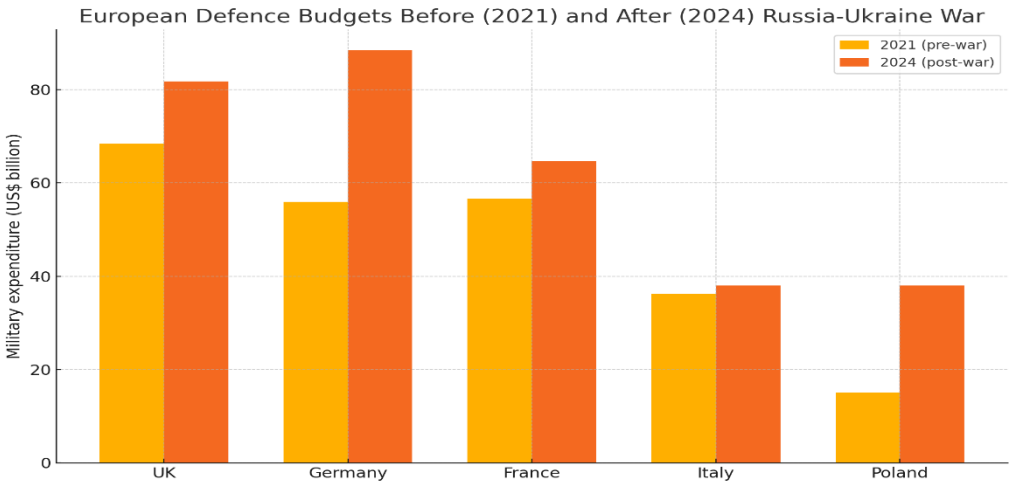

Fig.1 (comparing military outlays before Russia's full-scale invasion of Ukraine (calendar year 2021) with the most recent post-war data available (calendar year 2024)

3. Technological integration

Defence organizations worldwide are undergoing a profound transformation driven by rapid technological advancement. The emergence of artificial intelligence (AI), machine learning, big data analytics, and autonomous systems has the potential to redefine warfare, command structures, and defence strategies. However, the pace of innovation often surpasses the military's ability to adapt, constrained by legacy infrastructure, institutional inertia, and regulatory gaps. In this chapter, we will overview the technological, operational, and ethical challenges military organisations face and the reforms necessary to remain agile and responsible in a rapidly evolving security environment.

3.1. Legacy Systems vs. Modern Requirements

Many defence forces continue to rely on decades-old systems originally built for old conventional-style conflicts. These legacy platforms are the tanks, fighter jets, communication networks, and missile defence systems which are facing a lack the flexibility and digital architecture to accommodate next-generation technologies.

I will outline three key problems that are more commonly faced by defence forces:

- Outdated hardware and software often lack interfaces and abilities for integrating new components or software-based upgrades.
- Economical restraints and slow procurement cycles mean that by the time new systems are fielded, they may already be outdated.
- Reliance on proprietary or closed systems complicates interoperability between allied forces and different branches within the same military.

These technological holdups weaken strategic responsiveness and reduce effectiveness in modern multi-domain operations that require seamless coordination between land, sea, air, space, and cyber environments.

3.2. Integration Challenges: AI, Big Data, and Autonomy

Emerging technologies offer transformative capabilities but are difficult to implement into traditional defence structures. Integration of modern technological assets within military structures requires doctrinal changes, reassessment of standing operational procedures and a more hasty decision-making process. From these complex challenges, I would like to outline some of them:

Artificial Intelligence (AI) can enhance threat detection, autonomous navigation, decision support, and predictive maintenance conversely AI systems which require massive, high-quality datasets and computing power resources are not always available or secure for defence settings.

Big Data Analytics offers real-time battlefield insights, logistics optimization, and cyber threat anticipation for military operations, but integrating disparate data sources from legacy systems and ensuring data integrity under combat conditions is highly complex.

Autonomous Systems such are drones, unmanned ground vehicles, and robotic swarms offer cost-effective, risk-mitigated and prompt force projection, however full autonomy raises questions of command and control, as well as the system's ability to distinguish combatants from civilians under the laws of armed conflict.

3.3. Legal and Ethical Considerations

The deployment of advanced technologies in warfare introduces unprecedented ethical and legal challenges that cannot be resolved solely through technical solutions and requires legal and ethical frameworks, such as legal accountability and ethical implications:

Legal Accountability challenges are:

- Current international humanitarian law (IHL) and rules of engagement are not fully equipped to address scenarios involving autonomous lethal weapons or AI-based targeting.
- Who is responsible when an autonomous system makes a fatal error? Legal frameworks lag behind technological capability.

Ethical Implications arise from the following issues:

- Autonomous weapons raise moral concerns about delegating life-or-death decisions to machines.

- Issues of bias in AI models could lead to disproportionate or unlawful targeting based on flawed data or algorithmic discrimination.

To overcome these challenges defense organizations must establish oversight bodies and compliance protocols to ensure emerging technologies respect human rights, minimize civilian harm, and comply with the Geneva Conventions. The accelerating pace of technological change is reshaping the nature of defence and security. While emerging technologies offer unmatched opportunities to enhance capability, they also introduce serious integration, legal, and moral risks. Navigating this disruption demands a holistic approach—modernizing infrastructure, securing digital ecosystems, and embedding ethical and legal safeguards into every stage of development and deployment. Only then can defence institutions maintain both technological superiority and strategic legitimacy in an evolving world. However nowadays, we have witnessed the effectiveness of drones in Russian - the Russian-Ukraine war and understand that unmanned vehicles are the future of combat advantages.

3.4. Interoperability and Cybersecurity Risks

As defence systems become more digitally connected, interoperability and cybersecurity emerge as dual imperatives. On one hand, cross-platform compatibility is critical in coalition operations (NATO or UN missions), without common data standards or open systems architecture, joint operations become fragmented and inefficient but in another hand. Integrated digital systems expand the attack surface for adversaries and vulnerabilities in AI algorithms, communication protocols, and remote control systems can be exploited to disrupt operations or steal sensitive information.

4. Logistical complexities in Modern Defense

In an era of global interdependence and rising geopolitical uncertainty, defence logistics has become a critical strategic domain. Once a back-office function, logistics now plays a frontline role in military readiness, resilience, and global power projection. Defence supply chains are increasingly strained by the dual pressures of technological dependency and systemic vulnerability—exacerbated by events such as the COVID-19 pandemic, the Russia-Ukraine war, and tensions over Taiwan and the South China Sea. This chapter will be focused on the mounting complexity of defence logistics, highlighting the risks posed by supply chain fragility, geopolitical realignment, and sustainability mandates.

4.1. Globalization and the Fragile Defense Supply Chain

Modern military equipment like fighter jets, precision-guided munitions, and cyber-defence platforms depend on components sourced from dozens of countries, including adversarial or politically unstable regions. This globalization of production creates strategic exposure such as semiconductors and microchips which are produced in East Asian countries (notably Taiwan and South Korea) or Rare Earth Elements (REEs) which are critical for guidance systems, stealth coatings, and electric vehicles mainly produced in China (over 70% of the global supply). Disruption in this region, due to conflict or blockade, would paralyze global defence electronics.

As well currently we have recent supply chain shocks due to COVID-19: the world has been exposed to the fragility of just-in-time logistics and overreliance on single-source suppliers. Disrupted access to critical materials like titanium and nickel due to the Russia-Ukraine War forced NATO countries to rapidly reassess munitions stockpiles. Additionally increasing the use of economic weapons (chip bans on China or Russia) adds uncertainty to global procurement.

4.2. Geopolitical Realignment and Strategic Stockpiling

Defence ministries are rethinking logistics from a geopolitical risk lens, countries like the U.S., Germany, and Australia are investing in domestic manufacturing of critical components from drones to ammunition. Furthermore, EU's Joint Procurement of Ammunition and NATO's Strategic Airlift Capability seek to pool logistics and ensure shared access during crises. However, these measures come at a high cost and are often constrained by national-level fragmentation, bureaucratic inertia, and the long lead times required for industrial ramp-up.

4.3. Environmental Sustainability in Defense Logistics

Militaries are among the largest institutional consumers of fossil fuels, primarily for vehicles, aircraft, and naval fleets. According to some estimates, if the U.S. Department of Defense were a country, it would be the 47th largest emitter in the world. Within global climate commitments, militaries are under increasing pressure to reduce their carbon footprint, leading to a push for:

Electric and hybrid military vehicles
Alternative fuels (biofuels for naval ships and aircraft)
Energy-efficient logistics hubs and bases
Circular economy approaches (reuse and recycling of components)

This shift requires long-term investment, new procurement standards, and close collaboration with the commercial sector. It also raises tactical questions about fuel reliability, supply chains in hostile environments, and technology performance under combat conditions.

The age of smooth, just-in-time defence logistics is over. In its place, militaries must operate in an environment of perpetual disruption from pandemics and wars to climate shocks and political fragmentation. To succeed, defence logistics must evolve into a strategic capability that balances speed, security, sustainability, and sovereignty. This evolution will not be easy but it is essential for operational credibility and global stability in the 21st century.

Conclusion

The contemporary defence landscape is shaped by a web of interdependent, rapidly evolving challenges. Resource planning, once a primarily budgetary and logistical function, has become a multidimensional strategic imperative which is essential to national resilience, international influence, and military effectiveness. At the core of this complexity lies a fragile balance between human capital, fiscal resources, technological adaptation, and logistics infrastructure which now must operate as a tightly integrated ecosystem.

These factors are not fragmented they are deeply knotted, creating feedback loops that amplify risk. For example, fiscal austerity may delay technical integration, which in turn undermines the recruitment of high-skill talent, which then weakens the effectiveness of modern platforms. Similarly, logistics vulnerabilities can erode deterrence credibility, affecting alliance dynamics and procurement diplomacy. In response, defence institutions must adopt a systems-thinking approach to resource planning, one that accounts for strategic interdependencies, long-term resilience, and cross-domain innovation. This involves the following measures:

- Redesigning institutional structures to break down silos between operational planning, acquisition, and research communities.
- Fostering dual-use ecosystems that blend commercial innovation with defence needs, ensuring agility and affordability.
- Embedding adaptive planning models that can simulate uncertainty, manage risk portfolios, and respond dynamically to geopolitical shocks.

- Reframing sustainability and ethical oversight not as external constraints, but as core strategic competencies necessary for legitimacy and endurance.

Ultimately, the future of national security will be defined less by raw military power and more by the intelligence, agility, and cohesion with which nations manage their defence resources. Success will favour those who can integrate foresight with flexibility by building security architectures that are not only strong, but smart, sustainable, and socially accountable.

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EMOTIONAL CULTURE IN SPORT: THEORETICAL PERSPECTIVES AND RESEARCH DIRECTIONS

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Abstract:
In the era when we are talking about robots, drones and artificial intelligence in all areas, even in physical activities, we must remember that emotional intelligence is the basis of humanity. This small but very important detail makes us different from everything around us.
In sports, under the huge pressure of results, we see the dedication, strength, speed, technique that they possess, talent, the team's struggle to win, but never what is inside, what is behind them, namely the emotions of the athletes.
The emotional state of athletes depends on many variables, such as awareness of their own feelings and the possibility of managing them, recognition of certain emotional states of opponents or teammates, the effect that supporters or critics have, as well as the emotions transmitted indirectly by coaches. It should not be forgotten that emotions can be a motivating or demotivating factor, and for a sporting activity this can be decisive.

Key words: competition; emotional culture; emotions; individual performance; sport; success.

1. Introduction

The interplay between cognition and emotion has long occupied a unique place in emotion research. Although psychologists agree that the two are closely related, the field is easily polarized by debates about their interaction. These disagreements persist because they touch on issues of human nature: the conflict between the affective and cerebral sides of human experience, the need for rational control over irrational impulses, and the dangers of unrestrained feelings [1, p. 293]. Unlike cognitive culture, which guides how athletes think and behave, emotional culture sets the tone for how they feel. Despite growing recognition of the importance of how athletes feel and the emotions they experience during competition, emotional culture has been little studied in academia.

To study this connection, we used the Web of Science (WoS) database, because "WoS is a reliable and robust source of bibliometric data" [2]. The search was conducted according to the following topics:

- Topic 1: "emotional culture" OR "culture of emotion" OR "culture of emotions";
- Topic 2: "sport" OR "sports".

The search syntax was: "emotional culture" OR "culture of emotion" OR "culture of emotions" AND "sport" OR "sports".

The results obtained indicated a number of 179,145 publications in the period 1975-2026. For the year 2026, 32 scientific documents (journals, conferences) are already in pre-publication. The materials were published mainly in the following languages: English (mostly), Spanish, German,

Portuguese, Russian and French. We noted the existence of one article published in Arabic, Persian and Zulu.

For our study, we selected articles published in English in the last 5 years plus the current year (2020-2025). Refining the initial results led us to the following values:

a) by *publication period*. During the period chosen for our research – 2020-2025 – 75,347 documents were published. The largest number of documents was published in 2024 (figure 1).

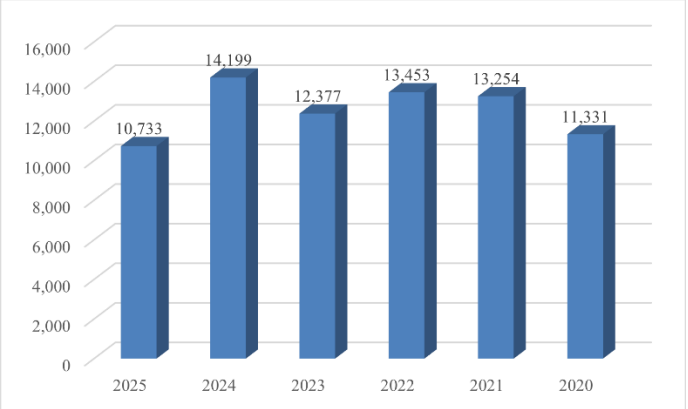

Figure 1 Number of articles published, per year, in the period 2020-2025
(Source: The authors)

gb) by the *language* in which the materials were published. The result was 71,047 documents in English;

c) by *document type*. During the research period, 2020-2025, 57,526 articles were published in English. These articles belong to 248 Web of Science Core Collection categories. In table 1 and figure 2, we have represented the first 10 Web of Science Core Collection categories in which the articles were published. From their analysis, it is noted that most of the articles that meet the criteria selected by us were published in the field of Sport Sciences (15,025).

Web of Science Categories	Record Count
Sport Sciences	15,025
Hospitality Leisure Sport Tourism	6,040
Orthopedics	4,709
Public Environmental Occupational Health	3,011
Medicine General Internal	2,383
Engineering Electrical Electronic	2,166
Environmental Sciences	2,078
Multidisciplinary Sciences	2,030
Rehabilitation	1,942
Education Educational Research	1,918

Table 1: Top 10 Web of Science Core Collection categories in which the articles in the research sample were published

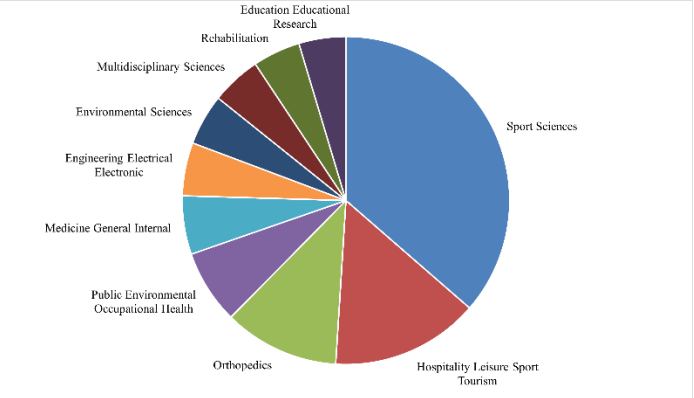

Figure 2 Figure 2 Top 10 Web of Science Core Collection categories in which the 57,526 English language articles were published in 2020-2025
(Source: The authors)

We analyzed the connections between research topics in the top 500 articles relevant according to WoS out of the 57,526 articles published in English between 2020 and 2025. Figure 3 shows the connections between topics.

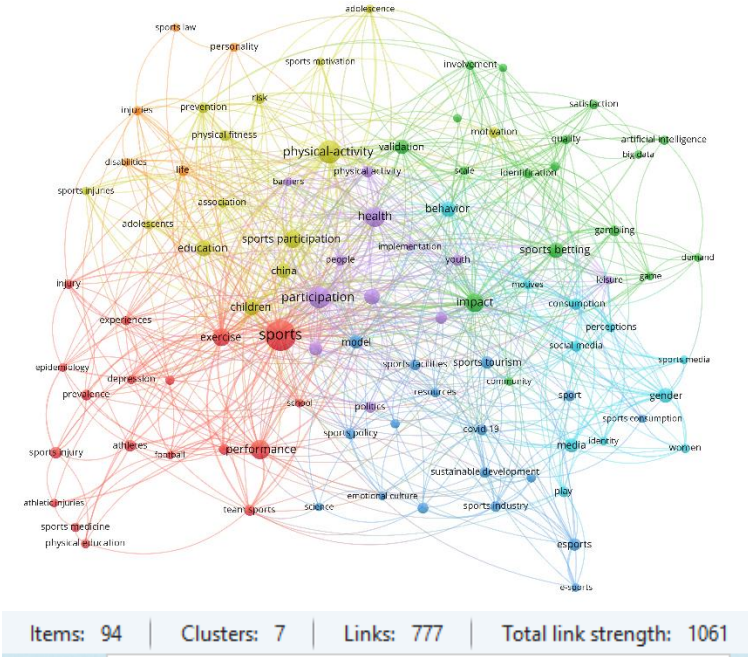

Figure 3 Relationship between research topics in the top 500 most relevant articles
(Source: created by the authors using VOSviewer)

Analyzing figure 3, it is observed that there is no direct connection between the topics. Topic 1, "emotional culture" OR "culture of emotion" OR "culture of emotions", is related to 7 keywords, the most important of which are "performance", "behaviour", "impact".

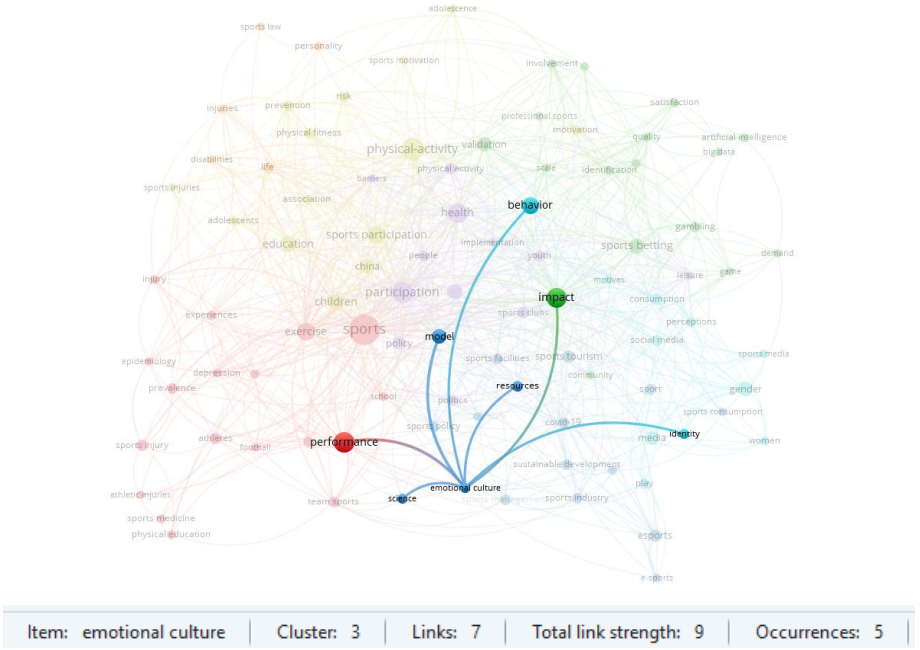

Figure 4 "Emotional culture" networking
(Source: created by the authors using VOSviewer)

Topic 2, "sport" OR "sports", is related to over 50 keywords, including: "physical-activity", "health", "participations", "behaviour", "impact", "gender", "performance" (figure 5).

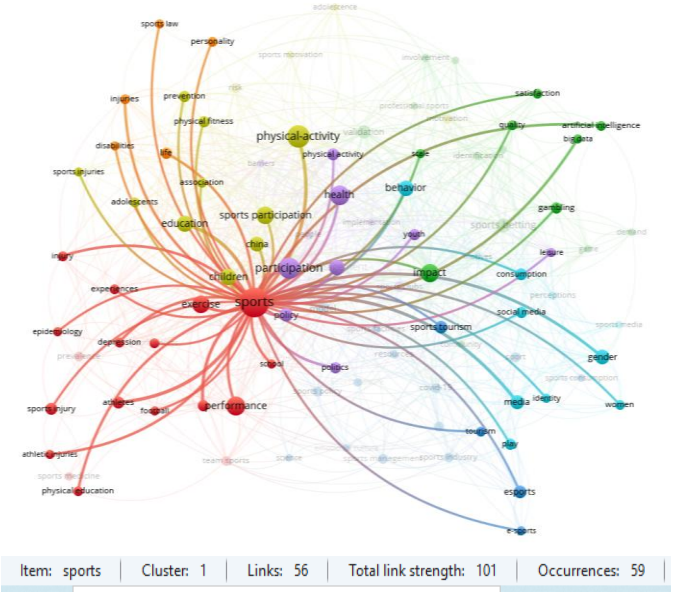

Figura 5 "Sports" networking
(Source: created by the authors using VOSviewer)

Although there is no direct connection between the researched topics, there are several indirect connections between them, through some keywords: "behaviour", "performance", "impact". The lack of a direct connection may be due to the fact that in general, emotional culture is associated

more with the employees of an organization and with the organizational culture, not with athletes and sport. In sport, the study of emotions and how athletes react under their impulse predominates.

2.Emotions in sports

Emotions cannot be avoided, they are an integral part of our lives and have physical, mental, behavioral and social effects, but what is important is how we relate to them. We have the power to amplify or diminish our emotions. Avoiding, ignoring, suppressing, hiding, repressing emotions are not appropriate approaches [3].

The role of emotions in individual performance. Emotions play a crucial role in sport activity by influencing athletes performance, motivation, and ability to cope with challenges. Emotion is a manifestation of the emotional system in response to an event or stimulus, involving a subjective experience (cognitive component), physiological response (arousal or activation), and tendencies to act. Emotions were perceived as unnatural experiences that exceed the scope of logical perception due to their interdependence with mood, disposition, creativity, motivation, and character [4].

Emotions, by their nature, timing, and intensity, can facilitate or hinder athletic performance. Consequently, athletes who have the ability to identify, understand, and effectively use emotions to their advantage have a distinct competitive advantage over those who lack such skills. Emotions act as signals about the importance of situations, and how athletes appraise these situations shapes their emotional responses and subsequent actions [5]. It is known that each sport has psychological characteristics and individual dimensions of emotional intelligence may have different relevance for sports performance. Both physiological and emotional challenges must be taken into account in physical training.

Sport in general is a context known for its high emotional intensity, in which emotions serve as signals of the importance of the situation. Emotional challenges are unique to sport, including social interactions, opponents, physical contact, environmental unpredictability, and referee decisions. Due to these factors, athletes must regulate their emotions in various ways to maintain focus, motivation, and optimal performance.

Emotional intelligence is a common denominator in sports activities and especially in sports performance [5]. Athletes face these challenges in sports activities, both during training and during competition. Consequently, the concept of emotional intelligence (EI) has become popular in sports psychology.

A substantial amount of research supports the theory that emotional fluctuations are linked to variations in athletic performance [6], [7], [8]. The emotional state of athletes is influenced by factors such as the level of competition, the type of competition, the level of skill, the level of preparation, the level of confidence, and the level of motivation. These factors can be influenced by the athlete's physical condition, mental state.

In conclusion, emotions are deeply connected to sports activity, influencing the way athletes experience, interpret and respond to the specific demands of their sport, having a direct impact on their performance and well-being.

Emotions as motivators and demotivators. Positive emotions and higher emotional intelligence can enhance motivation, while negative emotions like anxiety and stress can e demotivating. Emotions influence what we pay attention to. Positive emotions tend to broaden attention; negative ones can narrow it (which might help or hurt depending on the task) [9]. Emotions serve as signals of goal progress (or setbacks). For example, frustration can signal that current strategy isn't working — may motivate a change. But if too intense, leads to giving up. How

people appraise a situation (threat vs challenge; low control vs high control) influences whether emotion will lead to motivation or demotivation.

Emotions arising from doing something because you want to (autonomous) tend to be positive, reinforcing; doing something due to pressure or obligation (controlled) tends more likely to produce negative emotions and possible demotivation. Studies show that in workplaces, autonomous motivation combined with positive emotional experiences leads to better performance [10].

As I specified above, emotions, through the moment they appear, their intensity and type, their nature, have a direct and very strong impact on athletes' performance.

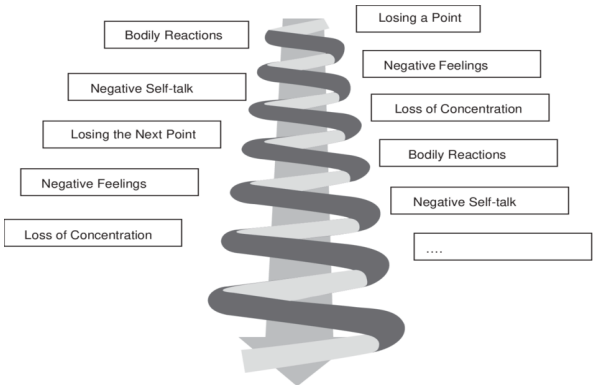

Figure 3 The impact of emotions on sports performance when emotions are not properly regulated (Source: [11])

A greater awareness of individual emotions generates a proactive attitude towards practicing high-intensity physical activities. Also, recognizing and regulating the type of emotions an athlete goes through increases the level of adaptation to competitive demands. In addition, athletes have lower levels of anxiety and competitive stress because motivation is viewed as a phenomenon that encompasses interconnected emotional, biological, social, and cognitive aspects and has been assessed based on observable behaviors [12], [13].

Positive emotions have a significant positive correlation with performance and with motivation [14].

Emotion	How It Can Motivate	How It Can Demotivate
• **Positive Emotions** (e.g. joy, pride, satisfaction)	• Boost intrinsic motivation — when people feel good, they are more willing to engage, persist, explore. • Improve performance via better attention, memory, openness. • In work: positive emotions mediate between autonomous motivation and better job performance.	• Overconfidence can lead to complacency (though less often discussed). • Distracting positive states can reduce alertness for risks or mistakes.
• **Negative Emotions** (e.g. anxiety, fear, guilt)	• Can provide urgency or signal importance (i.e. "there's a threat so I must act"). • Fear of negative outcomes or failure can push people to prepare or avoid mistakes. • Guilt/shame can sometimes trigger corrective action or self-improvement.	• Too much negative emotion can overwhelm cognitive resources, leading to anxiety, avoidance, procrastination. • Demotivating when people feel hopeless, under-supported, or believe effort won't help. • Can damage self-confidence, reduce intrinsic motivation.

Figure 4 The correlation between emotions - performance - motivation (Source: [14])

Managing emotions in competitions and training. Effectively managing emotions is a crucial skill for athletes, both in training and competition. It's not about eliminating emotions, but rather about learning to regulate them to enhance performance. Before you can manage your emotions, you need to understand them. Pay attention to the situations, thoughts, or people that consistently lead to strong emotional responses. Understanding what sets you off is the first step toward preparing for and responding to it effectively. Recognize that emotions like anxiety and frustration are a normal part of sports. The goal isn't to get rid of them, but to manage their intensity.

Teach and rehears the skills such as goal-setting, imagery/visualization, self-talk, relaxation, and performance routines as part of training (not only before competitions). Psychological skill training increases athletes' ability to regulate emotions and improves performance [15].

Stress and anxiety often manifest physically, calming your body can help calm your mind. There are some techniques that can be rehearsed and leaned to be used in those moments during competition when the athletes need them. Deep Breathing a simple but powerful technique. Box breathing (inhale for 4 seconds, hold for 4, exhale for 4, hold for 4) is a common method that can quickly calm your nervous system and help you reset. Progressive Muscle Relaxation it involves tensing and then consciously releasing different muscle groups, starting from your feet and working your way up. This practice helps release physical tension and promotes a sense of relaxation. Systematic and applied studies show preparatory routines help regulate emotions and boost self-paced motor performance [16].

Reappraisal changes the emotional response and preserves cognitive resources better than suppression [17]. These techniques focus on changing the thought patterns and mental state. Replace negative thoughts with positive, encouraging phrases. Athletes shall use simple mantras or cue words to help to refocus. They need to learn to interpret the physical symptoms of anxiety (fast heart rate, increased alertness) as signs of excitement and readiness, rather than fear. Before a competition or a difficult training session, vividly imagine themselves performing successfully. They shall picture themselves handling challenging situations and recovering from mistakes with confidence. Engaging all their senses in this "mental movie" can build mental toughness and reduce pre-game anxiety. Channel their energy into process goals rather than outcome goals. This helps the athletes stay grounded and reduces the pressure of things outside their control.

Consistency helps create a sense of control and reduces anxiety. Create practice scenarios that mimic competition stress (crowd noise, time pressure, scoring conditions) so athletes can rehearse emotional and tactical responses when stakes are high. Gradually increase stress to build resilience. Simulation and graded exposure are commonly recommended in sport emotion regulation literature and linked to better in-competition coping [18].

The coaches and athletes must be trained in supportive communication (emotion coaching, constructive feedback, shared routines). Social regulation can down-regulate negative affect and up-regulate helpful motivation during team collapse or high pressure. Tamminen et al. [19] show both self- and interpersonal regulations are used by athletes in competition; interpersonal regulation influences outcomes in teams. This can include also a specific physical warm-up, a playlist to listen to, or a mental checklist.

Prioritize sleep, nutrition, and hydration**,** these basic needs are fundamental to managing stress and maintaining a balanced emotional state. Dehydration and poor nutrition can exacerbate anxiety and negatively impact mood.

After a competition, reflect on what went well, not just what went wrong. Building a "confidence file" of your successes and effective moments helps reinforce your belief in your abilities and reduces future anxiety.

Conclusions

Emotions play an important role in physical activities in general, and in sports in particular. The process by which emotions are transferred among group members — often unconsciously it is known as *emotional contagion*. It can influence cooperation, conflict, cohesion, motivation, and perception of performance. Barsade [20] shows that positive emotional contagion improves cooperation, perception of task performance, and reduces conflict, while negative contagion has opposite effects.

The shared ambient emotional "weather" in a group, or how the members perceive the overall emotional tone, norms, and expectations, this is the group emotional climate. The emotional climate can be measured, and affects creativity, learning, adaptability, performance. Wahba [21] finds correlations between emotional climate and group effectiveness in real settings.

Positive emotion in a group reduces conflict and increases group reflection [22]. The emotional valence (positive/negative) of emotional expressions, and the status of the person expressing them, influence how contagion happens. Participants' emotions (felt and displayed) can be influenced by the positive/negative emotional language of a partner, and higher status amplified some effects, especially for negative emotion contagion.

More than simply "surprising" emotions, group members interpret and infer the meaning of others' emotional expressions. This influences decisions, expectations, and behavior. The emotions theory is often used to explain how emotional displays in groups lead to both affective (feelings) and cognitive (judgments, inferences) consequences [23]. Group members' emotions become more similar over time (often via contagion, synchronization of nonverbal cues). The groups tend to converge in extreme emotional states, whereas moderate or neutral states show more divergence [24].

It's not just what an individual feels, but what they *perceive* others are feeling that matters — the "group emotional climate". Even if somebody does not strongly feel an emotion, if they believe many others in their group do, that perception influences their behavior, well-being, judgments [25].

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THE INFLUENCE OF MILITARY ORGANIZATIONAL CULTURE ON PEOPLE'S MOTIVATION AND RETENTION

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Abstract:
Military culture has a big impact on how motivated service members feel and whether they choose to stay in the military. Unlike regular jobs, the military has a strict structure that focuses on discipline, duty, and teamwork. These values shape how soldiers see their roles, how dedicated they are, and whether they want to continue serving.

People in the military are motivated by different factors. Some are inspired by a sense of patriotism, strong friendships, and personal growth. Others are driven by rewards like promotions, good pay, and recognition. While these factors help keep morale high, staying in the military long-term depends on leadership, work-life balance, and career opportunities.

Keywords: *motivation; armed forces; military culture; efficiency; effectiveness.*

Introduction

Human resource management plays a crucial role in almost every organization worldwide, as it is responsible for developing policies and initiatives that support employees. This is because a company's workforce is its most valuable asset. Keeping employees motivated is a key component of this strategy, as motivation directly influences their efficiency and effectiveness. Furthermore, enhancing job happiness is critical for improved performance and productivity. In the armed forces, the importance of motivating personnel seems more important compared to civilians due to the unique nature of military service, which often involves high-risk situations, demanding physical and mental challenges, and long periods of separation from family and loved ones. Motivated personnel are more likely to perform their duties effectively and efficiently, even in adverse conditions (*Unlocking HRM Challenges: Exploring Motivation and Job Satisfaction within Military Service,* Dagher, Jean, Nada Mallah Boustani, and Chadi Khneyzer, 2024*).*

Military culture has a big impact on how motivated service members feel and whether they choose to stay in the military. Unlike regular jobs, the military has a strict structure that focuses on discipline, duty, and teamwork. These values shape how soldiers see their roles, how dedicated they are, and whether they want to continue serving.

People in the military are motivated by different factors. Some are inspired by a sense of patriotism, strong friendships, and personal growth. Others are driven by rewards like promotions, good pay, and recognition. While these factors help keep morale high, staying in the military long-term depends on leadership, work-life balance, and career opportunities.

At the same time, military life can be very demanding. Long deployments, frequent moves, and high-stress situations can make it difficult for service members and their families. Good leadership, strong support systems, and flexible career options are important for keeping people motivated and committed.

Motivation within the military context is multifaceted, driven by both intrinsic and extrinsic factors. Intrinsically, service members often feel a deep sense of purpose and honor in serving their country. The military emphasizes values such as loyalty, bravery, and sacrifice, which resonate with personnel and foster intrinsic motivation. Extrinsically, factors such as promotions, awards, and benefits also play critical roles. The structured nature of military advancement provides clear pathways for career progression, which can significantly enhance motivation.

Retention in the military is heavily influenced by organizational culture. A positive culture that promotes respect, inclusivity, and recognition significantly enhances retention rates. When service members feel valued and understood, they are less likely to seek opportunities outside the military. Conversely, a toxic culture characterized by poor leadership, discrimination, or lack of support can lead to high attrition rates.

This paper focuses on **four key elements**: leadership and command climate, cohesion and brotherhood, work-life balance, and recognition, rewards, and benefits, that significantly contribute to motivation and retention in the military context. These elements have been selected based on their alignment with Self-Determination Theory. Leadership and command climate support intrinsic motivation by fostering autonomy, competence, and relatedness through supportive environments. Cohesion and brotherhood reinforce the need for relatedness, fostering a sense of belonging and mutual support. Work-life balance enhances both autonomy and well-being, enabling individuals to maintain a sense of control over their lives. Finally, recognition, rewards, and benefits contribute to competence by affirming individual contributions and reinforcing a sense of accomplishment.

Understanding how these four elements work together helps to see different sides of what motivates soldiers and keeps them in the military. Looking at how these factors connect makes it easier to create better plans to improve job satisfaction and performance, helping build a stronger and more dedicated military team.

1. Leadership and Command Climate

Leadership is a critical factor in shaping the motivation and retention of military personnel. Effective leaders inspire, guide, and support their subordinates, influencing their commitment to the organization. Poor leadership, on the other hand, can lead to low morale, decreased motivation, and higher attrition rates.

A leader sets the **command climate** through their actions and words. Soldiers look up to their leaders and follow their example. A strong leader **sets clear standards and enforces them**, ensuring that discipline and ethical conduct are maintained. Ignoring rule violations creates a negative climate, while promoting open communication builds trust within the unit. Leaders must be approachable and willing to listen, rather than discouraging bad news or hiding problems.

Establishing a **positive command climate** is essential for mission success and maintaining the moral high ground. Leaders must intentionally create an environment of **discipline, ethics, and trust** to ensure their unit operates effectively and upholds military values.

Effective leadership fosters motivation and retention by building trust, respect, and confidence among personnel. Poor leadership, including toxic command environments, can lead to dissatisfaction and higher attrition rates. Mentorship programs and positive role models contribute to career satisfaction and progression (Lt. Col. Joseph Doty and Maj. Joe Gelineau, *Command Climate*, 2008).

Consistency and integrity further strengthen trust, as leaders who uphold their promises and treat all personnel fairly earn the respect of their teams. Encouraging teamwork and cooperation builds camaraderie by reinforcing a shared purpose and ensuring that success is collective rather than individual.

Army leaders must create conditions that encourage soldiers to continue their service. Senior leaders can enhance retention by focusing on leader development programs, incentivizing continued service, and effectively utilizing talent management.

Strong leadership plays a key role in retention. Effective leader development programs at unit, organizational, and strategic levels cultivate mentorship and trust. At the unit level, direct mentorship helps develop soldiers through training and feedback. Organizational leaders must foster a positive climate and implement team-building exercises. At the strategic level, policies should support long-term growth, ensuring leaders receive resources to train and guide Soldiers effectively.

Motivation drives retention. At the direct level, rewards and public recognition inspire soldiers. Organizational leaders must ensure fair recognition of performance to maintain morale. At the strategic level, leaders should align policies with long-term goals, including monetary incentives and bonuses for skilled soldiers. These measures encourage commitment and reduce turnover.

Leaders should develop soldiers' problem-solving abilities. Organizational leaders must provide career-enhancing opportunities and training. Strategically, the Army should refine promotion systems to offer constructive feedback and career guidance.

Improving retention requires investing in leadership development, incentives, and talent management. Building trust and fostering a culture of commitment ensures soldiers remain dedicated to the Army's mission, strengthening the organization's long-term success (*Improving Retention within the Organization*, MSG Jason G. Pickett, 2023)

2. Cohesion and Brotherhood

Military culture fosters deep connections among service members, creating a sense of belonging and loyalty that strengthens unit cohesion. The shared experiences of training, deployments, and hardships build strong bonds, reinforcing trust and mutual support. Soldiers rely on each other in high-stress situations, knowing that their teammates will always have their backs. This connection enhances morale and motivation, as service members push themselves not only for personal success but for the collective well-being of the unit. The brotherhood formed within military units often becomes a defining aspect of a soldier's identity, making it difficult to leave the service. Many remain because of the deep emotional ties and sense of purpose they feel within their teams. The camaraderie developed in the military extends beyond duty, as lifelong friendships often emerge from shared challenges and sacrifices. This close-knit culture plays a vital role in mission success, as trust and teamwork directly impact operational effectiveness.

Cohesion is the bond between team members that motivates them to work together. Cohesive teams develop trust, competence, and commitment, allowing them to overcome challenges. Cohesion can be categorized into two types: horizontal and vertical. Horizontal cohesion refers to the strong bonds formed among peers, reinforced through shared experiences and mutual support. On the other hand, vertical cohesion represents the connection between leaders and subordinates,

which is built on trust, competence, and a shared sense of purpose. Both forms of cohesion are essential for fostering teamwork, resilience, and overall effectiveness within a group.

French officer **Ardant du Picq** and U.S. Army historian S. L. A. **Marshall** both emphasized the importance of cohesion in combat. **Du Picq** argued that soldiers fight better when they know and trust each other. He believed cohesion comes from shared experiences, discipline, and stable unit organization. **Marshall** reinforced this idea through his WWII research, concluding that soldiers rely more on their comrades than on weapons. He emphasized the need for communication (tactical cohesion) to prevent isolation and panic in battle. He criticized the U.S. Army for treating soldiers as interchangeable resources rather than fostering strong, cohesive units (*Lessons in Unit Cohesion: from the United States Army's COHORT*, Michael R. Kearnes, Major, US Army Fort Leavenworth, Kansas, 2022).

Cohesion and brotherhood are fundamental to a soldier's experience, shaping both their motivation and long-term commitment to military service. The bonds formed through shared hardships, trust, and mutual reliance create an environment where soldiers feel a deep sense of belonging and responsibility toward one another.

Beyond immediate battlefield effectiveness, cohesion significantly impacts retention. Many service members choose to stay in the military because of their loyalty to their unit and the relationships they have built. The military's unique environment fosters lifelong friendships, reinforcing a strong sense of purpose even after active service. Additionally, cohesive units help soldiers develop resilience, allowing them to better handle the mental and physical stresses of military life, ultimately reducing burnout and increasing career longevity.

In essence, cohesion and brotherhood serve as powerful motivators that extend beyond the battlefield, influencing career decisions and fostering a commitment to the military. By maintaining strong unit bonds and emphasizing team-oriented leadership, military organizations can enhance both individual soldier well-being and overall mission success.

3. Work-Life Balance

More than half of active-duty and reserve personnel have family obligations. Whether it's your partner, children, or aging relatives, most service members have loved ones who rely on them at home. As a team, you must cope with separations, relocations, unpredictable schedules, and concerns about safety. On top of that, military service is not just a career choice—it's a legal commitment that binds you for several years, making it essential to find a way to manage everything, even during tough times.

Given all these challenges, achieving balance can be difficult when the boundaries between your professional and personal life are blurred. This is particularly true for dual military couples and families. However, work-life balance remains a top priority for many in the military. For instance, one of the biggest concerns expressed by service members is the time spent away from their families. Work-life balance matters to the military as well, as it directly influences retention. A positive balance is linked to job satisfaction and commitment, while a negative balance is associated with increased turnover intentions.

A military career demands time, energy, and commitment, making work-life balance especially challenging during training and deployments. Military personnel often experience unpredictable work schedules, frequent separations from family, and high workloads. These factors

contribute to work-life conflicts, which can impact job satisfaction and increase turnover intentions. Organizational support has been shown to mitigate these conflicts, improving retention and overall well-being (*Work-life balance among newly employed officers – a qualitative study*, Emma Oskarsson, Department of Security, Strategy and Leadership, Swedish Defence University, 2020)

I found the study that explores how newly employed officers in the Swedish Armed Forces (SAF) perceive work-life balance and its impact on their careers. Interviews were conducted with 34 newly employed officers (9 men, 6 women) and non-commissioned officers (17 men, 2 women), analyzed using thematic analysis. ages ranging from 23 to 45 years. The interviews lasted between 30 and 73 minutes and were conducted in private rooms to ensure confidentiality and openness.

The analysis revealed three main themes:

1. **Coping with Different Loyalties**: Officers faced challenges balancing their work responsibilities with personal life, often feeling torn between their commitment to the military and their relationships at home. Some officers tried to balance these loyalties, valuing their personal life more, while others prioritized their work role, even at the expense of personal relationships.

2. **Individual and Organizational Strategies**: Newly employed officers in the SAF face high workloads from the start, leading to stress and frequent overtime. Many officers are ambitious and take on more work than they can handle, leading to fatigue and burnout. At home, they mainly rest, leaving little time for socializing. Organizational strategies to help cope with these demands include mentoring and social events, but the lack of support in some units leaves officers feeling overwhelmed.

3. **Concerns about the Future**: Officers reflected on how their military career impacted their personal lives and future plans. Officers expressed concerns about managing the high workload and maintaining a balanced life, especially when it comes to family and career advancement. Some officers struggle with the demands of mobility and the impact on their personal lives. These concerns lead to doubts about their long-term careers in the military, with some thinking about leaving due to the stress and lack of recovery time.

In conclusion, the study highlights the challenges newly employed officers face in balancing work and life, driven by conflicting loyalties to the military and family. Organizational support is crucial to help officers manage these demands and avoid burnout. Clearer expectations and better work-life balance strategies could help retain qualified personnel in the SAF.

4. Recognition, Reward and Benefits

Recognition, rewards, and benefits play a significant role in motivating military personnel and influencing their retention. These elements collectively contribute to fostering a high level of engagement, commitment, and job satisfaction within the armed forces. The following discussion outlines how each of these factors plays a pivotal role in sustaining a motivated and retained military workforce.

Recognition within the military serves as an essential tool for reinforcing individual performance and achievement. Public acknowledgment of contributions, such as awards, commendations, and ceremonial honors, generates a sense of pride, purpose, and value among service members. Such recognition contributes not only to enhancing morale but also to cultivating a deep sense of commitment to both the mission and the organization. Through consistent

acknowledgment of effort and achievement, personnel are motivated to maintain high standards of performance, which, in turn, strengthens overall unit cohesion.

Both monetary and non-monetary **rewards** serve to incentivize exceptional performance and maintain high levels of motivation among military personnel. While the military is not primarily driven by financial incentives, strategic rewards such as bonuses, pay increases, and special allowances are effective in recognizing specialized skills, critical assignments, and leadership roles. Additionally, non-financial rewards, including opportunities for career advancement, additional leave, and special privileges, provide personnel with further motivation to excel.

Comprehensive **benefits** packages are among the most compelling factors for military personnel considering long-term service. The military offers robust healthcare options, including medical, dental, and vision care for service members and their families, which contribute significantly to the well-being and job satisfaction of personnel. Furthermore, the military's pension and retirement plans, which provide substantial financial support after a designated number of years of service, serve as powerful incentives for retention.

The found research explores motivation and job satisfaction among service members in the Lebanese Armed Forces (LAF) amidst various challenges. Using a mixed-method approach, the study involved interviews with 42 service members, a focus group with 12 experts, and a survey of 3,880 LAF members. Study found that monetary rewards and praise are key motivators, with salary being the most important factor in job satisfaction. Economic challenges, like declining purchasing power, and health issues, such as rising medical costs, negatively affect motivation. Security challenges had no significant impact. The study recommends offering competitive salaries, recognition programs, fair compensation, regular salary reviews, and support for physical and mental well-being to improve motivation and job satisfaction *(Unlocking HRM Challenges: Exploring Motivation and Job Satisfaction within Military Service (LAF)*, Jean Dagher, Nada Mallah Boustani and Chadi Khneyzer, 2024).

Recommendations:

Based on my paper's discussion on the importance of HRM models within military establishments, here is a list of recommendations considering the opportunities and limits of these models.

Military organizations can improve motivation and keep their personnel by using flexible HRM models that support work-life balance. Policies like flexible working hours, remote work when possible, and family support programs can help improve well-being. However, the tough nature of military work, including long deployments and high-pressure situations, may make it hard to fully apply these changes.

Leadership training that focuses on emotional intelligence, mentorship, and trust can create a more people-friendly management style. While helpful, challenges within the system and resistance from senior officers may slow down its adoption. Similarly, recognizing achievements beyond just money—through praise and public appreciation—can boost motivation. But this must be combined with clear career growth opportunities and mental health support to truly make a difference.

Stronger team bonds can be built through organized team-building activities and casual social events. However, frequent moves and high turnover can weaken these efforts. Mental health support, such as counseling and stress management programs, is also important, but stigma and concerns about privacy might stop some people from seeking help.

Clear career growth plans with mentorship and professional development can improve job satisfaction, but military career paths are often strict, which may limit flexibility. Open communication about job opportunities and welfare programs can build trust, but military hierarchy may slow down or filter information, leading to frustration among lower ranks.

Policies that support military families, such as flexible deployment schedules and help with relocations, can make life easier for service members. However, the unpredictable nature of military service may limit how effective these efforts can be. By finding the right balance between these opportunities and their challenges, military HRM practices can better support motivation and long-term service.

Conclusion

Motivation and retention in the military are shaped by leadership, unit cohesion, work-life balance, and recognition. Effective leadership fosters trust and commitment, while strong bonds among service members enhance morale and a sense of duty. Work-life balance remains a key challenge, requiring organizational support to reduce stress and improve career longevity. Additionally, recognition, rewards, and benefits play a crucial role in maintaining job satisfaction. A strategic approach that integrates these factors can enhance motivation, reduce attrition, and strengthen military effectiveness, ensuring long-term success in personnel management.

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NON-ECONOMIC AND ECONOMIC BENEFITS IN DEFENSE

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Abstract:

The defence sector plays a multifaceted role in shaping both the economic and non-economic landscapes of a nation. This paper explores the economic benefits of defence, focusing on job creation, technological advancements, industrial growth, and trade opportunities. The defence industry provides millions of jobs, spanning a wide range of professions from engineers to assembly line workers. In particular, the U.S. Department of Defence employs over 3 million people, which underscores the sector's role in supporting individuals, families, and local economies. The multiplier effect of defence spending is evident in the increased demand for local services, such as housing and retail, within defence-centric communities. Additionally, defence R&D drives technological innovation, leading to breakthroughs like the internet and GPS, which have broad civilian applications, further fostering economic growth. Defence spending also supports industrial growth in sectors such as aerospace, electronics, and cybersecurity, benefiting both large corporations and small and medium-sized enterprises (SMEs). Defence exports play a critical role in national economic strategy, providing revenue while strengthening international partnerships and regional stability.

On the non-economic front, national security remains the primary purpose of defence spending. A strong military deters external threats, ensuring stability and protection for a nation's citizens and infrastructure. This sense of security is foundational to a society's functioning, enabling citizens to thrive without the fear of aggression. Defence capabilities also contribute to geopolitical stability, allowing nations to participate effectively in diplomacy and conflict resolution. Military strength acts as a bargaining tool in international negotiations, helping nations to secure favourable outcomes and prevent conflicts. Furthermore, the defence sector fosters social cohesion by uniting individuals from diverse backgrounds through shared experiences in military service. This bond contributes to national identity and pride, promoting greater social stability and engagement.

The interdependence of economic and non-economic benefits is evident in the relationship between economic growth and national security. A thriving economy supports military investment, while a capable military secures economic interests and facilitates trade. Defence spending also fosters social stability, enhancing public trust and civic participation. Ultimately, a comprehensive approach to defence policy is necessary, one that balances military preparedness with broader societal priorities to ensure long-term prosperity, resilience, and security.

Keywords*: *economic and non-economic benefits;economy; innovation; national security; economic growth.

Introduction

Defence spending is essential to a nation's security, stability, and prosperity, extending well beyond its primary goal of protecting the country from external threats. While national security remains the central focus, the broader economic, technological, and social benefits of defence spending play a crucial role in the overall well-being of a nation. The relationship between military readiness and national growth is cyclical, with each element strengthening the other. Strategic defence policies must strike a balance between military needs, economic development, and societal goals to ensure long-term stability.

National security is the most immediate and direct benefit of defence spending. A strong military enables a country to protect its borders, safeguard sovereignty, and ensure the safety of its citizens from various threats, including military aggression, terrorism, and cyber-attacks. The security provided by a capable military allows the economy and society to function without the constant threat of external instability. Without national security, economic activities would be hindered, and social cohesion would be at risk, as fear and uncertainty would undermine the nation's ability to thrive.

Beyond security, defence spending drives economic growth. The defence sector generates millions of jobs, spanning from highly skilled engineers to assembly line workers, contributing to local economies and creating long-term employment opportunities. Defence-related jobs stimulate demand for services such as housing, education, and retail, resulting in a multiplier effect that enhances economic activity in surrounding regions. Moreover, defence spending fosters industrial growth by supporting various sectors, including aerospace, electronics, and cybersecurity. The stabilizing effect of defence contracts is valuable in times of economic downturns, providing steady employment and production.

Additionally, defence spending fuels technological innovation that benefits both military and civilian sectors. Military research and development (R&D) have historically been at the forefront of breakthroughs like the internet, GPS, and advanced materials. These technologies, initially developed for military purposes, have been adapted for commercial use, driving new markets and industries. Defence R&D encourages collaboration between government, academia, and private industry, fostering innovation that enhances national competitiveness and supports global growth. The spillover of these technologies into civilian industries amplifies the broader economic impact of defence spending.

The defence sector's influence extends beyond economic benefits to provide geopolitical stability. A well-funded military enables nations to assert their interests in diplomacy and conflict resolution. Military strength acts as a bargaining chip, allowing countries to shape outcomes in trade, security, and peace-building efforts.

Social cohesion is another key benefit of defence spending. The military serves as a unifying institution, where citizens from diverse backgrounds come together for national defence. This shared experience fosters camaraderie, discipline, and a sense of purpose, which extends beyond the armed forces to positively impact civilian life. Veterans and active-duty personnel often return to their communities with leadership qualities and a strong sense of civic duty, contributing to volunteerism, social responsibility, and community development.

A strong national defence also enhances the psychological well-being of citizens. When people feel secure, they are more likely to engage in economic, social, and cultural activities, contributing to a stable and prosperous society. National defence reassures citizens that their government can protect them from external threats, reducing anxiety and fostering national pride. This psychological security is crucial for maintaining a healthy society.

In conclusion, defence spending is vital not only for national security but also for economic prosperity, technological advancement, and social cohesion. Understanding the interdependence between military preparedness, economic growth, and social well-being is essential for crafting effective defence policies. By investing in defence, nations secure not only their borders but also their long-term stability and prosperity.

1: Economic Benefits of Defence

1.1: Job Creation

The defence sector is a significant source of employment, providing millions of jobs across various skill levels and professions. From highly skilled engineers and scientists engaged in cutting-edge research and development to assembly line workers in manufacturing plants, the range of employment opportunities is vast. For instance, the U.S. Department of Defence alone employs over 3 million people when counting civilian workers, active-duty military personnel, and contractors. This job creation not only supports individuals and families but also contributes to local economies, particularly in regions where defence contractors are concentrated. The multiplier effect of defence spending can be observed in communities where defence-related jobs lead to increased demand for local services, such as housing, education, and retail. As defence contracts are awarded, they not only provide direct employment but also stimulate ancillary sectors, such as logistics and transportation, creating a ripple effect that enhances overall economic vitality.

1.2: Technological Advancements

The defence industry has historically been at the forefront of technological innovation, with many breakthroughs originating from military research and development programs. Technologies such as the internet, GPS, and advanced materials were initially developed for military purposes before being adapted for civilian use. The transfer of these technologies into the commercial sector not only enhances the quality of life for citizens but also fosters economic growth by creating new markets and industries. Moreover, the investment in defence R&D stimulates collaboration between government, academia, and private industry, leading to a more innovative economy that can compete globally. The interplay between defence spending and technological advancement drives not only military efficacy but also societal progress, as innovations previously confined to defence applications find transformative uses in healthcare, transportation, and communication.

1.3: Industrial Growth

Defence spending fuels the growth of a wide range of industries, including aerospace, electronics, and cybersecurity. This industrial growth is not limited to large defence contractors; small and medium-sized enterprises (SMEs) also benefit from government contracts, often serving as suppliers or subcontractors. The influx of government contracts can result in increased investment in facilities, workforce training, and innovation, ultimately enhancing the competitiveness of the national industrial base. Additionally, defence-related industries can have a stabilizing effect on the economy, providing jobs and economic activity even during downturns in other sectors. This resilience is particularly important in regions heavily reliant on defence contracts, where the stability of the local economy can hinge on the continued viability of defence spending.

1.4: Trade and Export Opportunities

Defence exports represent a crucial aspect of a nation's economic strategy, allowing countries to leverage their military capabilities for international trade. Countries like the United States and France have established themselves as leading arms exporters, generating significant revenue while also strengthening alliances and partnerships. The sale of defence equipment and technology can enhance diplomatic relationships and foster regional stability, creating a favourable environment for broader economic cooperation. By participating in global defence markets, nations can not only secure economic benefits but also promote their strategic interests abroad. Moreover, successful defence exports can lead to a feedback loop where increased military cooperation leads to further economic opportunities in other sectors, thereby reinforcing the importance of defence in a country's overall economic landscape.

2: Non-Economic Benefits of Defence

2.1: National Security

At its core, the primary purpose of defence spending is to ensure national security, protecting a nation from external threats, aggression, and instability. A robust defence posture not only deters potential adversaries but also provides a crucial sense of security for the nation's citizens. This security is essential, as it enables the country to function smoothly, allowing its institutions and citizens to thrive without the constant threat of attack or invasion. The ramifications of inadequate defence can be dire, as historical examples have shown. Countries that have underestimated their military needs, such as Poland before World War II, faced catastrophic consequences when they were caught unprepared. Poland's failure to build strong alliances and fortify its defences left it vulnerable to foreign aggression, leading to its invasion by Nazi Germany and the Soviet Union.

A strong defence capability allows nations not only to protect their borders but also to project power beyond their immediate vicinity. This projection of power can be used to safeguard vital economic interests, secure strategic resources, and maintain sovereignty in a rapidly changing global environment. Furthermore, in times of crisis, a capable military force can quickly mobilize, ensuring that the country can protect its interests and defend its citizens.

Beyond the physical aspect of security, the psychological assurance provided by a capable military is invaluable. Citizens tend to have a heightened sense of security when they believe that their nation can defend itself against external threats. This assurance not only strengthens individual confidence but also enhances collective morale. National security serves as a psychological anchor, fostering a sense of unity and pride in the face of potential threats, and reinforcing the importance of national sovereignty. This collective identity becomes especially important during times of war or national crisis, as it binds citizens together to protect their homeland and preserve their way of life.

2.2: Geopolitical Stability

A well-funded defence apparatus contributes significantly to geopolitical stability by enabling nations to participate effectively in international diplomacy and conflict resolution. Military strength can serve as a bargaining chip in diplomatic negotiations, allowing countries to secure favourable outcomes in international forums and assert their interests on the world stage. Nations with strong military capabilities are better positioned to influence the course of international events, whether in trade negotiations, conflict resolution, or peace-building efforts.

In today's interconnected world, geopolitical stability often hinges on the balance of power between competing nations and blocs. Strong military forces allow nations to project their influence and deter hostile actors, preventing potential conflicts from escalating. Furthermore, defence alliances such as NATO play a critical role in maintaining peace and stability in various regions of the world. NATO's collective defence principle ensures that an attack on one member is considered an attack on all, creating a powerful deterrent to adversaries. This cooperative security arrangement fosters mutual trust and enables member nations to coordinate their efforts to address common threats, ranging from regional instability to transnational security challenges like terrorism or cyber attacks.

Additionally, defence capabilities can help to stabilize regions plagued by conflict. Nations with credible defence systems are often better positioned to engage in peacekeeping operations and humanitarian missions. Their military forces, when deployed in peacekeeping roles, can provide security and logistical support, facilitating the delivery of humanitarian aid and creating the conditions necessary for peace negotiations. Countries with strong, well-trained militaries are often seen as stabilizing forces in volatile regions, offering hope and support to communities caught in the throes of conflict.

2.3: Social Cohesion

The defence sector plays an important role in fostering social cohesion within a nation, acting as a unifying force that strengthens national identity and collective purpose. The military serves as a common institution where citizens from diverse ethnic, religious, and socio-economic backgrounds come together, often setting aside differences to work towards a shared goal of national defence. This shared experience of service, whether in training or in combat, creates strong bonds among individuals, leading to a sense of camaraderie and mutual respect. These bonds are not limited to the military itself but extend into the broader society as veterans and active-duty personnel often return to civilian life with a sense of discipline, leadership, and duty that they carry into their communities.

Military service also fosters a unique sense of pride and patriotism, which can lead to greater social engagement and community participation. Veterans, who have made significant sacrifices for their country, are often viewed as role models and leaders within their communities, contributing to social stability and volunteerism. Their leadership extends beyond the military into civic life, where they serve as mentors, organizers, and advocates for causes that benefit society as a whole. These individuals often play key roles in building social infrastructure, helping to create environments where citizens actively engage in activities that promote community development, education, and public welfare.

Moreover, the shared experiences of military service contribute to greater understanding and dialogue among different demographic groups. In societies marked by diversity, the defence sector can act as an equalizer, bringing people together in a way that transcends cultural and socio-economic boundaries. By participating in a national institution that upholds values such as discipline, respect, and selflessness, individuals from all walks of life can forge connections that promote unity and inclusivity. This shared sense of purpose is essential for the health of a democracy, as it fosters a population that is committed to the ideals of justice, liberty, and equality.

2.4: Psychological Well-Being

A secure environment is fundamental to the psychological well-being of citizens. When people feel safe from external threats, they are more likely to engage in positive social, economic, and cultural activities, contributing to a stable and prosperous society. National defence, by protecting citizens from potential dangers, fosters an environment in which people can focus on personal growth, career development, and family life. Conversely, insecurity, fear, and the constant threat of attack can lead to heightened anxiety, stress, and social unrest. The psychological effects of living under the shadow of potential conflict are profound, often causing individuals to withdraw from community life and reducing their overall quality of life.

Understanding the psychological impact of national defence is crucial for policymakers, as a stable and secure population is better equipped to contribute positively to society. A nation that is constantly in fear or under threat cannot fully develop its human capital, as people are preoccupied with survival rather than thriving. A strong national defence system provides the necessary stability for citizens to pursue their goals without the looming fear of violence or conflict. This, in turn, leads to greater economic productivity, social engagement, and overall happiness.

The reassurance provided by a capable defence system can also have long-term positive effects on societal well-being. When citizens know that their government is able and willing to protect them from external threats, they are more likely to invest in their future—whether by starting businesses, pursuing education, or planning for retirement. The psychological security that comes with a strong national defence system is a foundational element of a healthy, functioning society, one in which citizens feel empowered to build meaningful lives and contribute to the greater good.

3: Interdependence of Economic and Non-Economic Benefits

3.1: Economic Growth and National Security

The relationship between economic growth and national security is both cyclical and mutually reinforcing, with each supporting the other in a dynamic feedback loop. A thriving economy provides the financial foundation needed for military investment, including research, development, personnel training, and advanced equipment procurement. A strong economy allows nations to prioritize defence spending without jeopardizing other critical sectors like healthcare and education. Conversely, a capable military ensures the protection of the nation's economic interests, infrastructure, and trade routes, enabling economic stability even in times of global uncertainty. Historical examples, such as the economic hardships faced by nations in the aftermath of the World Wars, show that without a strong economy, military readiness can be compromised, leaving the country vulnerable to external threats. Countries that wisely invest in their defence sectors often experience long-term economic benefits, including technological innovation, job creation, and industrial growth, thus creating a virtuous cycle of security and prosperity. Therefore, strategic allocation of resources to defence should be viewed as an investment in the nation's future rather than just a financial burden.

3.2: Technology and Security

Defence spending often drives technological advancements that enhance not only military capabilities but also national security across various sectors. Technologies developed for military purposes, such as advanced encryption, cybersecurity tools, autonomous drones, and satellite systems, have significant civilian applications that protect critical infrastructure, public health, and energy networks. Innovations in cybersecurity, for example, are vital to safeguarding sensitive data from cyberattacks that could disrupt national security and economic stability. As the line between military and civilian technologies continues to blur, the potential benefits extend beyond defence, enabling governments to better protect their citizens in an increasingly interconnected world. However, the dual-use nature of many of these technologies also introduces risks, as uncontrolled or poorly managed technological advancements can pose unintended threats. Policymakers must carefully balance the development and deployment of defence technologies to maximize their benefits for both military and civilian sectors while mitigating potential security risks. Effective integration of these innovations can enhance national resilience and security, particularly in emerging fields like cyber defence and artificial intelligence.

3.3: Defence Spending and Social Stability

Defence spending plays a crucial role in maintaining social stability by fostering a sense of security and trust in public institutions. When citizens feel confident that their government is prepared to protect them, particularly in times of crisis, they are more likely to engage positively with their communities and participate in democratic processes. A strong and capable military provides the reassurance that the nation is ready to face external threats, which strengthens social cohesion, national identity, and a collective sense of purpose. During crises such as natural disasters or geopolitical conflicts, a well-resourced military can provide both direct security and support for relief efforts, further enhancing social stability. Moreover, veterans and active-duty military personnel often assume leadership roles in society, contributing to the social fabric by fostering a spirit of civic responsibility and volunteerism. These leaders are integral in strengthening community bonds and promoting resilience. Defence spending, therefore, helps create a foundation of stability, trust, and active citizenship, which is essential for maintaining a healthy democracy and social well-being.

3.4: Policy Implications

Effective defence policy formulation must consider the interdependence between military preparedness, economic prosperity, and social well-being. Policymakers need to strike a balance between investing in national security and addressing broader societal needs, ensuring that defence spending aligns with long-term national priorities such as infrastructure, healthcare, and education. A comprehensive approach involves fostering public-private partnerships in defence innovation, which can lead to advancements in both military technology and civilian industries. These collaborations not only strengthen national security but also generate economic benefits, including job creation and technological progress. Policymakers must also ensure that defence expenditures do not come at the expense of critical domestic investments. By aligning defence spending with national priorities, governments can ensure that military investments contribute to a secure, prosperous, and resilient society. A holistic approach that recognizes the interconnectedness of economic, military, and social factors is essential for preparing nations to face the complex security challenges of the future while fostering a thriving, cohesive population.

Conclusion

Defence spending plays a crucial role in national security, economic growth, and social cohesion. It provides both economic and non-economic benefits that are essential for the well-being of a nation, highlighting the importance of balancing military preparedness with broader societal needs.

Economic Benefits of Defence

The defence sector is a significant source of employment, offering a wide range of jobs from engineers to assembly line workers. This employment creates economic activity in communities and has a multiplier effect, stimulating demand for local services. Defence spending also drives technological innovation that often spills over into civilian markets, improving industries and creating new ones. Technologies like GPS and the internet, initially developed for military purposes, have had profound civilian applications. Additionally, defence spending supports industries like aerospace and cybersecurity, helping to stabilize the economy, especially during downturns. Defence exports also bring substantial revenue and strengthen international alliances, benefiting the broader economy.

Non-Economic Benefits of Defence

National security is the primary objective of defence spending. A strong military ensures the protection of borders, infrastructure, and sovereignty, providing citizens with the safety and stability necessary for a prosperous society. It also enhances geopolitical stability by enabling nations to influence international diplomacy, prevent conflicts, and engage in peacekeeping operations. Moreover, a capable military stabilizes regions in conflict, fostering peace and security.

Defence also promotes social cohesion. The military unites individuals from diverse backgrounds, fostering a shared sense of purpose and national identity. Veterans contribute to society by taking on leadership roles, strengthening communities through civic engagement. Military service transcends cultural and socio-economic differences, helping build unity in democratic societies.

Psychologically, a strong defence system gives citizens the confidence to pursue personal and societal goals. It creates an environment where individuals can focus on their futures without the fear of external threats. This sense of security enhances overall well-being and leads to greater social and economic participation.

Interdependence and Policy Implications

Economic growth and national security are deeply interlinked. A thriving economy funds military investment, while a strong military secures national interests, fostering stability for economic development. Technological innovations driven by defence spending benefit both military and civilian sectors. Moreover, a stable society with strong social cohesion enhances national resilience.

Policymakers must balance defence spending with other national priorities, such as healthcare and infrastructure, ensuring that military investments contribute to the long-term prosperity of the nation. Public-private partnerships in defence innovation can yield advancements that benefit both sectors, creating job opportunities and fostering technological progress.

In conclusion, defence spending is an essential investment in a nation's security, economic strength, and social cohesion. By understanding the interdependence of economic, military, and social factors, nations can secure their borders, foster economic growth, and create a stable and prosperous society for the future.

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THE BUDGET MANAGEMENT BY OBJECTIVES IN TUNISIA

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Abstract:
The budgetary management by objectives is part of the establishment of a new mode of management of the State budget based on the principle of good governance which aims to improve efficiency and ensure transparency in the execution of the state budget.

Thus, budget management by objective not only allows for better spending but also improve the efficiency of public action. We can therefore say that the main objectives of this new system are the strengthening of transparency and the optimization of the financial management of public expenditure.

For this purpose, This paper explores the concept, nomenclature, and implementation of Budget Management by Objectives in Tunisia, highlighting its role in enhancing fiscal responsibility, optimizing public resources, and fostering economic development and the final chapter depicts the functioning of budget management by objective within Tunisian armed forces.

***Keywords**: maanagement by objectives; budget; governance; public resouces; optimization.*

Introduction

Public financial management is a cornerstone of effective governance, ensuring that resources are allocated efficiently to meet national development goals. In Tunisia, the Budget Management by Objectives (BMO) was introduced as a key reform to enhance transparency, accountability, and performance in public expenditure. This approach shifts the traditional line-item budgeting system towards a program-based model, where financial allocations are linked to specific objectives and measurable outcomes.

The adoption of BMO aligns with Tunisia's broader efforts to modernize its public administration and improve service delivery. By integrating strategic planning, performance indicators, and monitoring mechanisms, the system ensures that government spending is results-driven rather than merely expenditure-focused. Moreover, it grants public institutions greater managerial autonomy while maintaining rigorous oversight to prevent inefficiencies and misallocation of resources.

So, Budget Management by Objectives represents a novel approach centered on tangible results to achieve predefined goals and objectives corresponding to the services provided. The objective is to establish a new form of administration that demands a heightened level of transparency in the country's financial system.

This approach involves defining budgets created through programs that align with public policy and incorporate performance indicators. It enables the measurement of goal achievement and evaluation of the contribution of program managers, who are accountable not only for resource utilization but also for service outcomes.

1. Concept of budget management by objectives:

1.1 History:

The history of Budget Management by Objectives (BMO) in Tunisia is intertwined with the country's broader efforts to reform public financial management, improve transparency, and ensure more efficient allocation of government resources. The concept of performance-based budgeting, including BMO, was introduced gradually and was influenced by both global trends and Tunisia's domestic needs.

After the 2011 Revolution, Tunisia's commitment to reforming its governance and public financial management systems intensified. The post-revolution period marked a significant shift toward greater transparency, accountability, and citizen participation in the budgeting process. As part of this new governance model, the government continued to expand and refine its use of Budget Management by Objectives.

The 2014 Tunisian Constitution emphasized the importance of good governance and transparency, providing a legal foundation for further reforms in public financial management, including performance-based budgeting. In this period, there was also a strong push to involve civil society in the budget process, fostering broader participation and monitoring of the budget's execution.

Finally, it is from 2019 that we can really talk about the reform in terms of budget management by objectives after the Tunisian parliament adopted a new organic budget law on February 13, 2019.

This new organic law has brought many concept that must be followed when preparing the budget. In addition to dividing and clarifying the tasks of each stakeholder, it also devoted the principle of responsibility and accountability in order to further improve transparency and integrity in the management of public funds.

2. Definition:

The Organic Budget Law (OBL) of 2019 in Tunisia introduced the Budget Management by Objectives (BMO) framework, aiming to enhance public financial management through a performance-based budgeting system. This approach focuses on aligning financial resources with specific policy objectives and measurable outcomes.

So The BMO aims at a new mode of management that requires a degree of transparency of the financial mechanisms of the State, in the sense that it allows the implementation of a budget established by programs translating the public policies with performance indicators allowing to measure the achievement of the assigned objectives and to appreciate the contribution made by those in charge of the programs, the latter are required to account not only for the use of resources but also for the results of their services. This makes it possible to strengthen the effectiveness of public action and increase performance by directing the budget towards results, such are the aims of this reform.

The BMO fundamentally reforms the budget and management of the State. It establishes optimized management of State finances through the introduction of objectives and performance indicators. By developing a culture of results, the BMO makes it possible to spend better and improve the effectiveness of public action for the benefit of all. It is a process that serves to better manage public funds by rationalizing public choices, but to guarantee good management of public finances, reliable and exhaustive financial and budgetary information must be accessible and promptly on time

In BMO mode, the budget will be presented by missions, programs, and sub-programs. When the program structure is established, an effort must be made to transcribe the budget into the program nomenclature, by drawing up a transition table.

3. Objectives:

Budget management by objectives (GBO) in Tunisia, established by the Organic Budget Law (LOB) No. 2019-15 of February 13, 2019, aims to modernize the management of public finances by emphasizing the performance and efficiency of public spending and the most important objectives are:

3.1. Improving the effectiveness and efficiency of public spending via:

- Direct resources towards concrete and measurable results.
- Avoid waste and optimize the use of public funds.

3.1. 2. Strengthening transparency and accountability via:

- Ensure better readability of the budget for citizens and stakeholders.
- Define performance indicators for each budget program.
- Hold public managers accountable based on the results obtained.

3.1.3. Moving from a logic of means to a logic of results:

- Instead of simply allocating funds, evaluate the real impact of public policies.
- Implement management focused on achieving precise and quantifiable objectives.

3.1.4. Strengthen the control and evaluation of public policies by:

- Establishing a mechanism for regular evaluation of budgetary programs.
- Allow Parliament and control institutions to have a clear vision of state performance.

3.1.5. Increase budgetary flexibility and adaptability by:

- Introducing asymmetric fungibility, allowing managers to reallocate credits within a program (except for staff costs).
- Adapt budgetary policies to real needs and socio-economic developments.

3.1. 6. Strengthen medium-term budget planning via:

- Adopting a multi-year approach (3 years) to guarantee the coherence and sustainability of public policies.
- Improving budgetary predictability and avoid ineffective annual arbitrations.

In summary, the GBO aims for more transparent, more efficient and more results-oriented management, in order to improve the quality of public services and ensure optimal use of state resources.

3.2. Budget management by objectives, Principles and implementations:

Section1. New nomenclature and Principle:

3.2.1. New nomenclature:

- **Classification:**

The Organic Budget Law introduced a new budget nomenclature in Tunisia, based on budget management by objective (GBO), it's a new classification based on several criteria to improve transparency and budget management.

* Classification by economic nature: It distinguishes between revenues and expenditures according to their economic nature:

A. State budget revenues:
- Tax revenue (direct and indirect taxes).
- Non-tax revenues.
- Donations and external aid.

B. State budget expenditure: Expenses are divided into six categories:
- Remuneration expenditures (public personnel salaries and benefits).
- Management expenditure (operation of administrations).
- Intervention expenditure (subsidies, social assistance).
- Investment expenditure (infrastructure, equipment).
- Financial operations expenses (debt repayment).
- Unexpected expenditure.

* Classification by destination (budgeting by programs):
- The budget is structured into missions (major state objectives).
- Each mission is divided into programs (specific public policies).
- Each program includes subprograms.
- Each subprograms includes operational unit and activities.

* Classification by source of financing:
- General State budget (State's own resources)
- Ancillary budgets (services financed by specific revenues)
- Special Treasury accounts (funds allocated to specific missions)

The 2019 budget nomenclature provides a more detailed and functional classification, promoting better management and more rigorous monitoring of public finances in Tunisia**.**

❖ **The difference between old and new nomenclature:**

The budgetary reform introduced by the Organic Budget Law (LOB) of 2019 in Tunisia modified the budgetary nomenclature by establishing an approach by missions and programs, unlike the old nomenclature which was mainly based on an economic and administrative classification. Here are the main differences:

3.2.2. Approach by objectives (New nomenclature) vs. Administrative approach (Old nomenclature):

• Old nomenclature:

- Budget presented by ministries and by chapter (e.g.: personnel expenditure chapter, material expenditure chapter, etc.).
- Accounting and administrative vision without direct link to expected results.

• New nomenclature:

- Budget organized by missions and programs, each ministry being responsible for several programs linked to its strategic objectives.
- Performance-based approach, with results indicators to assess the effectiveness of spending.

A more detailed and functional classification:

- Old nomenclature: Classification into titles and chapters, not very flexible and rigid.
- New nomenclature: Distribution of expenditure into programs, sub-programs and actions. Each program has a budget and must achieve specific objectives.

Expenditures presented in a more readable manner:

- Old nomenclature: Expenditures grouped into general sections without clear distinction of the purposes of the funds.
- New nomenclature: Expenses are divided into six principal categories:
  - Remuneration expenditures (public personnel salaries and benefits).
  - Management expenditure (operation of administrations).
  - Intervention expenditure (subsidies, social assistance).
  - Investment expenditure (infrastructure, equipment).
  - Financial operations expenses (debt repayment).
  - Unexpected expenditure.

4. Introduction of a multiannual budgetary framework:

- Old approach: Budget voted each year without long-term vision.
- New approach: Introduction of a medium-term budgetary framework which allows planning over 3 years, ensuring better predictability of public spending**.**

More transparency and control:

The new nomenclature requires ministries to justify the impact of their expenditure and to monitor performance indicators and this allows for better evaluation of public policies and strengthens the accountability of public managers.

4.1. Principles:

The principles of budgetary management by objectives (BMO) in Tunisia, as addressed by the new nomenclature of the Organic Budget Law, focuses on aligning public spending with specific outcomes, rather than simply categorizing expenditures.

Key Elements of Budgetary Management by Objectives:

1. Focus on Results: The central goal of this type of management is to make public administration more efficient by focusing on achieving specific, measurable, and assessable objectives, rather than on financial inputs alone.

2. New Types of Budget Credits: According to the new nomenclature, budget credits are now allocated based on performance objectives. These credits are divided into three categories:
- Operating credits: for financing the activities necessary to manage public services.
- Investment credits: for funding key projects aimed at improving public infrastructure.
- Intervention credits: for supporting specific programs such as social aid or subsidies.

3. Clear Identification of Objectives: For each program, there must be clear and specific objectives, accompanied by performance indicators that allow tracking progress and evaluating the effectiveness of public fund usage. This ensures more transparent and accountable management.

4. Accountability and Evaluation: Each unit or program within public administration is responsible for the results it must achieve. A rigorous follow-up and evaluation of the outcomes are implemented to assess the efficiency of the allocated funds.

5. Reduced Rigidity: Unlike traditional budget management, where credits are often fixed for specific expenditure items (such as salaries, equipment, etc.), BMO allows for greater flexibility in adjusting funds based on the results achieved.

6. Alignment with Strategic Planning: BMO is part of a long-term planning process that aligns with the country's economic and social development goals. It fits into the medium- and long-term projects of ministries and public organizations.

7. Control and Transparency: There is a strong emphasis on strict control and increased transparency of public expenditures, ensuring that funds are used justifiably and allowing for corrections when necessary

So, the principle of budgetary management by objectives, as outlined in the new nomenclature of the Organic Budget Law in Tunisia, aims to make public administration more efficient, transparent, and accountable for the use of public funds, based on measurable performance criteria

4.2. Implementation of the BMO:

4.2.1: keys:

The implementation of budget management by objectives in Tunisia, according to the Organic Budget Law of 2019 follows these key:

1. Program-Based Budgeting:

- The budget is structured into programs, sub-programs, and activities, replacing the traditional administrative budget structure.
- Each ministry or public entity defines strategic objectives for its programs.
- Each program is linked to specific policy goals and measured by performance indicators.

2. Multi-Year Budgeting (Medium-Term Budget Framework - MTBF):

- The budgeting process follows a three-year framework, ensuring greater predictability and sustainability in public spending.
- Annual budgets must align with the medium-term financial planning to maintain coherence and fiscal discipline.

3. Performance Measurement and Accountability:

- Each program includes quantifiable performance indicators to evaluate efficiency, effectiveness, and impact.
- Program managers (Responsible de Programme - RPROG) are accountable for achieving the objectives assigned to their programs.
- An Annual Performance Report (Rapport Annual de Performance - RAP) is submitted to Parliament to assess the achievement of targets.

4. Strengthened Role of Parliament and Transparency:

- The Parliament approves the budget based on program objectives and expected performance, not just expenditures.
- A Citizen Budget is published to enhance public access to budget information and foster transparency.
- The Parliament plays a more active role in monitoring performance and ensuring public accountability.

5. Flexibility in Resource Management:

- Program managers have greater autonomy in managing resources within their programs, allowing for better adaptability to real needs.
- Funds can be reallocated within a program, provided the changes do not compromise the program's objectives.
- Emphasis is placed on optimizing resource use rather than just controlling expenditures.

6. Strengthened Control, Audit, and Evaluation Mechanisms:

- Internal and external audits ensure compliance with budgetary rules and evaluate program effectiveness.
- The Court of Auditors plays a key role in assessing performance and accountability.
- A performance-based evaluation determines future budget allocations, ensuring that underperforming programs are reviewed and adjusted.

3.2.2: calendar:

The implementation of budget management by objectives in Tunisia, according to the Organic Budget Law of 2019 does not prescribe a specific calendar for the budget process, it outlines key stages and timelines that guide the preparation, presentation, and execution of the state budget.
Key Stages of the Budget Process:

1. Preparation:

- Initiation: The Ministry of Finance begins the budget preparation process by issuing guidelines to ministries and public institutions.
- Submission: Each ministry submits its proposed budget, structured around programs and missions, to the Ministry of Finance.

2. Review and Approval:

- Examination: The Ministry of Finance reviews the submitted budgets, ensuring alignment with national priorities and fiscal constraints.
- Presentation: The draft budget is presented to the Council of Ministers for approval.
- Parliamentary Review: The approved draft is submitted to the Assembly of People's Representatives (ARP) for discussion, amendment, and ratification. Parliament has a two-month period to discuss, amend, and ratify the budget.

3. Execution:

- Implementation: Once ratified, the budget is implemented by the respective ministries and public institutions.
- Monitoring: The Ministry of Finance monitors budget execution, ensuring adherence to approved allocations and performance targets.

4. Reporting:

- Reporting: Regular reports on budget execution are prepared and submitted to the ARP and the Court of Auditors.
- Audit: The Court of Auditors conducts audits to assess the legality and efficiency of budget execution.

5. Annual Timeline:

January:
- Issuance of budget preparation guidelines by the Ministry of Finance.
- Submission of proposed budgets by ministries.

February to April:
- Review and consolidation of submitted budgets by the Ministry of Finance.
- Preparation of the draft budget for Council of Ministers' approval.

May:

- Presentation of the draft budget to the Council of Ministers.

June to July:
- Submission of the approved draft budget to the ARP.
- Parliamentary discussions and amendments.

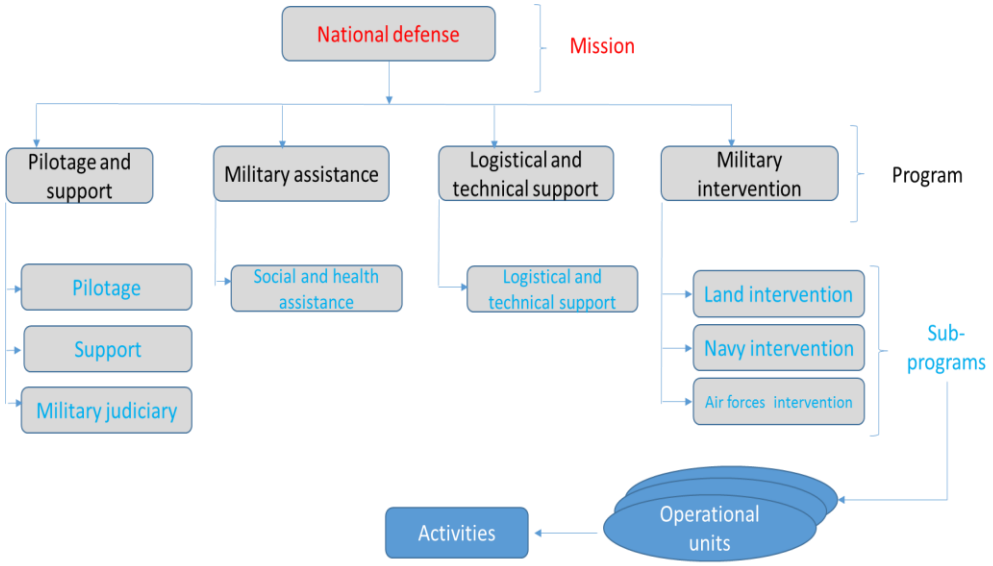
August:
- Ratification of the budget by the ARP.

September to December:
- Implementation of the budget by ministries and public institutions.
- Monitoring and reporting on budget execution.

4. Budget management by objectives in Tunisia Armed Forces:

4.1. Structure:

Like all ministries and administrations, the ministry of national defence as a mission is divided into four programs and eight sub-programs which contribute to the achievement of the strategic objectives of the mission.
Thus the programmatic division of the mission is presented as follows:



- The minister of national defence leads the MoD mission.
- The general director of the administration and finance affairs leads the pilotage and support program.
- The general director of the military health leads the military assistance program.
- The general director of ammunition and armaments leads the logistical and technical support program.
- The chief of the cabinet of the MoD leads the military intervention program.

The structure of the Tunisian Ministry of Defence's programs typically reflects its strategic priorities, national security objectives, and resource allocations.

4.2. Information System:

Until today there are three information systems used within the Minister of National Defense for better budget management. In fact, we have a budget preparation system, a project monitoring system and the performance information system.

4.2.1 Budget preparation system:

The budget preparation system is a tool that allows managers and responsible at all levels to better manage the budget in a very clear way. Indeed, this system allows to:

- Plan the budget at the level of each program, for a period of three years, deem necessary for the execution of the various activities attached to the operational units belonging to the sub-programs.
- Thus, after the approval of the finance law, this system allows the distribution of credits allocated vertically: from the program to the sub-programs and operational units.

4.2.2 Project monitoring system

This system is very useful, budget management by objectives, since it allows those in charge of the programs, sub-programs and operational units to monitor in a very relevant way the status of the registered projects.

It gives a very clear vision of the progress of the program projects. In fact, in this system all the projects programmed and validated by the program manager are entered with clear information and detail such as the project cost, the duration of the execution in number of days and the steps to follow from the beginning of the project study until its execution. It, also, permits to follow the execution rate of projects as a percentage of credit consumption and physical progress.

4.2.3 Performance information system:

The performance information system is a digital solution designed to meet the needs of actors involved in the chain of responsibility of a public policy:

- The head of the mission needs to have a dashboard consolidating the operational results of the structures responsible for the implementation of public policies, and giving him the possibility of instantaneous monitoring of developments relating to the strategic results of the mission to which he is accountable to parliament.
- The program manager needs a tool to facilitate the management of his program through the use of an organized and structured management dialogue which will lead to the collection and aggregation of indicators. Thus, it will be able to transfer timely information available on the public policy to which it is accountable in front of users and citizens.
- The various actors in the chain of responsibility need to have a tool allowing the operational management of data related to performance measurement and really formalizing the organization of the management of the program and its operational variation. Each operational actor participates in setting values on the forecast of the indicator for which he is responsible. He has the necessary levers to direct all the means he controls towards achieving his target.

Conclusion:

Budget Management by Objectives (BMO) in Tunisia, as outlined in the Organic Budget Law (LOB) of 2019, represents a significant shift in the way the government manages public finances. The core principles of BMO—focusing on results, enhancing accountability, and improving efficiency—are designed to address the country's public financial management challenges, promote transparency, and ensure that public resources are allocated effectively to meet

the country's strategic goals. Through the introduction of a program-based budget, clear performance indicators, and multi-year planning, Tunisia's budgetary reforms aim to move away from a rigid system based solely on expenditures, towards a more dynamic, results-oriented approach.

The reform is ambitious, with efforts to improve governance, foster citizen participation, and ensure that public funds are used optimally. The inclusion of new information systems for budget preparation, project monitoring, and performance management adds further value by ensuring that all actors in the process can monitor progress in real time and make data-driven decisions. These innovations, combined with increased accountability through parliamentary oversight and audits, promise to strengthen the public sector's capacity to deliver services efficiently, but despite its promising outlook, the implementation of BMO in Tunisia faces several challenges like for example the Data Collection and Quality because to be effective, accurate and timely data is essential. However, the quality and availability of performance data across all sectors may vary, making it difficult to assess results and make informed decisions, so establishing robust data collection systems is crucial for the success of the reform, and also effective monitoring and evaluation mechanisms are vital for assessing whether the set objectives are being met. Ensuring that these mechanisms are not only in place but also robust and well-executed will be a challenge, particularly in the context of the limited resources available for audits and evaluations.

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THE ROLE OF TECHNOLOGY IN ENHANCING INTEGRATED HUMAN RESOURCE MANAGEMENT (IHRM) IN MILITARY ORGANIZATIONS

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Abstract:

Efficient management of human resource is essential in military organizations, for operational readiness, personnel development, professional performance management, and mission effectiveness. However, traditional HRM systems of military organizations, with inherent complexities in organizational structures/ deployment requirements, relies on legacy/ manual procedures and often struggle with integration, efficiency, and adaptability. The advancement of technology/ digital tools are offering opportunities for transforming military HRM by enhancing recruitment, training, performance management, and workforce planning. This research aims to explore that how emerging technologies/ digital tools (such as AI, data analytics and automation etc) can be integrated into HRM system of Military Organizations, identify factors impeding the effective integration of these solutions and chalk out strategies for overcoming these challenges; with a focus to optimize operational readiness and workforce management. The findings suggest that adopting advanced digital HRM solutions can significantly improve efficiency, decision-making, and personnel management in military organizations. Paper concludes with recommendations for policymakers/ military HRM professionals on leveraging technology for a more integrated/ effective HRM system.

***Key Words**: Technology in Military HRM systems, Integrated Human Resource Management (IHRM), Human Resource Information System (HRIS), Workforce Planning, Performance Management.*

1. Introduction

The Integrated Human Resource Management (IHRM) refers to a comprehensive approach to managing human resources that align all HR functions – such as training, performance management, compensation, and employee engagement – within unified framework. The goal is seamless workflow, enhance efficiency and ensure that HR strategies support the overall objective of the organization. IHRM in military organizations has evolved over centuries. HRM system of armies of different countries may vary i.e. depending upon the respective operational requirements/ tasks; nevertheless, the operational capability of any military is dependent on its Human Resource. Whether it is war fighting, peacekeeping, or humanitarian relief/ assistance missions; the key to success is employment of the right personnel with the right qualifications at the right place/ job.

HRM plays an essential role in Military Organizations, which is different than corporate HRM and is highly structured, in ensuring operational readiness and efficient workforce management; entailing rapid deployment, skill-based tasks, continuous training to withstand evolving security challenges, and manage related administrative aspects [1]. Traditionally, the military HRM system has relied on manual processes and legacy systems, which at times affects the workforce management/ performance, negatively.

The advancement of technology offer opportunities for effective HRM practices and warrants military organizations to adopt digital solutions, such as Artificial Intelligence (AI), Human Resource Information Systems (HRIS), Big Data Analytics, and Cloud Computing etc, for

enhancing efficiency, especially in the fields of recruitment, training, performance management, and workforce planning [2]. However, the challenges of cybersecurity risks, resistance to change, budget constraints, and difficulties in integrating new technologies with existing systems impedes the adaptation of technological advancements ([3],[4]). Addressing these challenges is essential for achieving a well-integrated and technology-driven HRM system.

This research aims to explore factors impeding the effective integration of advanced technological HRM solutions in military organizations and chalk out strategies for overcoming these challenges. The objectives of this research are: to study the current state of technology adoption in military HRM system; to identify key barriers in effective technology integration; and to proffer recommendations for improving technological implementation in Military HRM.

The scope of this paper encompasses an in-depth analysis of the role of technology in enhancing Military IHRM system; for streamlining HR functions such as recruitment, training, performance management, and workforce management. Moreover, explore the challenges in implementing digital solutions i.e. cybersecurity risks, resistance to change, budget constraints, and integration issues with legacy systems. The paper also presents case studies from leading military organizations to illustrate best practices and lessons learned. Finally, it provides policy recommendations while addressing potential barriers. The study is primarily based on secondary data sources, literature reviews, and case analyses.

Thesis Statement: By examining the organizational, cultural, and technological factors that influence technology integration, this paper will demonstrate that a strategic and adaptive approach is essential for military organizations to fully leverage the potential of advanced HRM solutions.

2. Literature Review

2.1 Current State of Technology Adoption in Military HRM

The digital transformation of HRM has gained significant traction across various sectors, including military organizations. Studies indicate a growing adoption of HRIS, Learning Management Systems (LMS), and Talent Management Digital Tools to enhance personnel management; for instance, US Airforce is transitioning from traditional HR system to digital talent management systems driven by data and business needs [5]. Similarly, the British Army has embarked on a transformation program to integrate digital tools for effective workforce management [6]. However, research also reveals that the implementation of these technologies within military HRM system is often irregular and seamless integration with advanced technological tools remained limited. Challenges such as data security concerns, compatibility issues with legacy systems, and user resistance to adopting new technologies impede this integration [7]. Furthermore, challenges in ensuring data interoperability and security across diverse military branches; require robust infrastructure, common protocols and technological platforms to enable effective information exchange ([8],[9]).

2.2 Challenges in Military HR Technology Integration

The effective integration of advanced HRM technologies in military system is hindered by a range of organizational, cultural, and technological barriers; where, legacy system, cultural resistance to change and concerns over data security further exacerbate these challenges [10]. Technologically, the complexity of integrating new systems with existing legacy infrastructures poses significant difficulties. Addressing these multifaceted barriers requires comprehensive

strategies; encompassing organizational restructuring, cultural change initiatives, and technological upgrades ([11],[12]).

Studies also show that digital literacy gap among military personnel can hinder the effective use of advanced HRM technologies. Therefore, a comprehensive evaluation and eradication of these barriers is essential [13]; for instance, the Irish Defense Forces and the UK's MoD have recognized the necessity of enhancing digital proficiency among their staff to keep pace with technological advancements. However, their strategy has been impeded by skills gaps and outdated technology, underscoring the need for comprehensive evaluation of the barriers [14].

2.3 Identifying Gaps for Way Forward

While existing literature highlights the potential benefits of technology in military HRM, there is a notable gap in research that provides practical and actionable recommendations for overcoming integration challenges. Specifically, studies have not fully addressed the development of tailored implementation strategies for organizational and cultural aspects of military organizations. Moreover, there is a limited understanding of how to effectively bridge digital literacy gap, so as to foster a culture of technology acceptance among military personnel. Besides, there is lack of research that focuses on the integration of advanced technologies in deployed environments. This research aims to address these gaps by providing concrete recommendations for enhancing technology integration, including strategies for developing comprehensive training programs, fostering a culture of continuous improvement, and ensuring data security. By focusing on these areas, this study will contribute to optimizing personnel management and readiness in military organizations.

3. Methodology

This research employs a qualitative approach, relying primarily on a comprehensive review and synthesis of existing literature to address the research objectives; focusing on analyzing and evaluating the integration of advanced HRM technologies within military organizations.

Literature Review and Synthesis

The primary data source for this research is a thorough review of academic journals, online defense publications, and relevant open/ online sources. Literature review is focused on: (1) the current state of technology adoption in military HRM; (2) the organizational/ cultural & technological barriers that impede technology integration; and (3) best practices/ recommendations for enhancing technology integration into military HRM system.

Case Studies/ Exemplars Analysis

To provide a practical perspective and supplement the literature review, focused examples are incorporated; selected on the bases of their relevance to the research objectives. These exemplars are specific instances where military organizations have attempted to integrate advanced HRM technologies.

Data Analysis

The data analysis involved a thematic examination of the literature and case studies/ exemplars; identifying best practices, successful implementation strategies, and impediments encountered by military organizations while integrating advanced HRM technologies. The findings from the literature review and case studies/ exemplars facilitated to formulate practical and actionable recommendations, to adopt technology in military HRM system, for enhancing efficiency, decision-making, and workforce management.

Limitations

This paper is primarily based on a literature review, which may limit the generalizability of the findings. However, the use of credible and diverse sources, combined with focused exemplar analysis, enhances the validity of the research. Due to page constraints, the number of exemplars is limited.

4. Findings and Discussion

This section presents the findings from the literature review and exemplar analysis, deliberating their implications for military organizations, to enhance efficiency, seeking to adopt technology in their integrated HRM system.

Current State of Technology Adoption

The integration of technology into military HRM system is undergoing a significant transformation, driven by the need for efficient management of human resource for operational readiness, personnel development, professional performance management, and mission effectiveness i.e. to meet the requirement of modern military operations. The focus is to optimize the process of recruitment, training, performance/ carrier management, deployment and streamlining administrative tasks. The advanced technological tools such as AI-driven HR systems, Learning Management Systems (LMS), and automated performance metrics (HRIS) etc. are playing pivotal role in enhancing operational efficiency and decision-making within military organizations [15]. These systems enable military organizations to track personnel records, manage administrative aspects, digitize data, manage performance/ carrier streams, automate payroll processes, and selection of right man for right job etc; leading to improved accuracy and reduced administrative burden [16].

The integration of advanced technological HRM solutions in military organizations, such as HRIS and LMS, is increasing. Where HRIS is serving as a centralized platform, streamlining various HR functions (e.g. IPPS-A in U.S. Army); while LMS is particularly used in the realm of training/ development i.e. to deliver online courses, virtual simulations, and interactive learning experiences, providing personnel with access to training materials anytime, anywhere. This has proven especially valuable for deployed units, where traditional classroom-based training may be impractical. [17]. Secondly, Talent Management Platforms are also gaining traction in military HRM, offering tools for identifying, developing, and retaining high-potential personnel. These platforms facilitate planning, performance management/ career development initiatives, enabling military organizations to optimize their workforce [18].

Despite the growing adoption of these technologies, significant challenges remain. Data interoperability and security are critical concerns, particularly in the context of multinational military operations. The need to ensure secure data exchange and protect sensitive information across diverse systems and networks presents a significant technical and organizational hurdle ([19]. Furthermore, the uneven distribution of digital literacy among military personnel is also hindering the effective use of advanced HRM technologies. While younger generations may be more comfortable with digital tools, older personnel may require additional training and support [20].

In conclusion, the current state of technology adoption in military HRM is characterized by both progress and challenges. While HRIS, LMS, and Talent Management Platforms offer significant potential for enhancing personnel management, their effective integration requires a strategic and holistic approach that addresses interoperability, security, and digital literacy concerns.

4.1 Barriers Impeding Technology Integration

The successful integration of advanced HRM technologies within military organizations is often impeded by a complex web of organizational, cultural, and technological barriers [21]. These

barriers can significantly hinder the effective adoption/ utilization of technological tools like HRIS, LMS, and Talent Management Platforms, ultimately impacting personnel management and operational readiness [22].

Organizational Barriers

Military organizations are typically characterized by rigid hierarchical structures and bureaucratic processes, which significantly impede the rapid adoption of new technologies [23]. Decision-making processes, with obvious reasons, is slow and cumbersome, requiring approvals from multiple levels of command. This leads to delays in technology procurement, implementation, and updates. Furthermore, the lack of clear lines of authority and responsibility create confusion and hinder effective project management. Resource constraints, including limited budgets and personnel, also pose significant challenges. The need to prioritize resources for operational needs, at times, lead to underfunding of technology initiatives, resulting in outdated systems and inadequate support. Moreover, the integration of new technologies with existing legacy systems is complex and time-consuming process, requiring significant technical expertise and coordination.

Cultural Barriers

Military culture, with its strong emphasis on tradition, discipline, and established procedures, also creates resistance to technological change [24]. Personnel accustomed to traditional methods are found hesitant to embrace new technologies, particularly if they perceive them as disruptive or unnecessary. The fear of job displacement or the perception that technology will undermine established command structures also contributes to resistance. Furthermore, the lack of digital literacy among some military personnel creates a sense of anxiety and apprehension about using new technologies. Effective change management strategies, including clear communication, training, and leadership support, are essential to overcome these cultural barriers. The need to show the value of the new systems, and how they will make the lives of the military personnel better, is also very important.

Technological Barriers

Technological barriers, such as data security concerns and the complexity of integrating diverse systems, pose significant challenges to military operations. The increasing reliance on data-driven strategies exposes sensitive information to potential cyber threats, necessitating robust security measures to protect operational data and personnel privacy [25]. Ensuring data interoperability across different systems and platforms is also crucial for seamless data exchange and collaboration. However, the lack of standardized data formats and protocols, at times, hinder interoperability [26]. Digital literacy gaps among military personnel also impedes the effective use of advanced HRM technologies. It is viewed that younger generations are more comfortable with digital tools, while older personnel require additional training and support [27]. Besides, the rapid pace of technological change necessitates continuous updates and maintenance, requiring considerable investment and technical expertise. Moreover, the challenges of operating in austere environments, with limited connectivity and infrastructure, also poses a challenge and requires alternate means of connectivity and backups; thereby posing administrative considerations.

5. Case Studies Analysis and Discussion

The US Army's Integrated Personnel and Pay System – Army (IPPS-A) initiative serves as a compelling example of the challenges inherent in large-scale technology integration within a military context. IPPS-A, designed to consolidate personnel and pay data across the Army, faced significant implementation hurdles. The complexity of integrating numerous legacy systems, each with its own data structure and protocols, proved to be a major obstacle. Furthermore, the need for standardized data across different Army components, including active duty, reserve, and National

Guard, added another layer of complexity [28]. This case highlights the critical importance of meticulous planning, phased implementation, and robust data management strategies in such endeavors. Additionally, the cultural aspect also played a role. Resistance to change from personnel accustomed to legacy systems necessitated extensive training and change management efforts.

Conversely, the use of Learning Management Systems (LMS), in US Army, for remote training in deployed military units showcases the potential of technology to enhance training effectiveness in challenging environments. LMS platforms provided flexibility and accessibility, enabling personnel to access up-to-date training materials regardless of their location [29]. For example, virtual simulations and mobile learning apps have been successfully deployed to provide realistic and engaging training experiences. However, challenges related to limited internet connectivity in remote locations and the need for mobile-friendly content remain. Military organizations must prioritize investments in robust infrastructure and tailor LMS content to the specific needs of deployed units to maximize the benefits of these platforms.

NATO's Advanced Distributed Learning (ADL) initiative further illustrates the complexities of multinational technology integration. The need to harmonize training standards and systems across diverse national militaries, each with its own unique requirements and legacy systems, has slowed the process of interoperability. Language barriers, differences in training methodologies, and varying levels of technological expertise among member nations have also contributed to the challenges. The initiative underscores the importance of strong leadership, effective communication, and a collaborative approach to overcome these hurdles. The difficulties in achieving consensus between multiple international entities has resulted in a slow implementation process [30].

These exemplars collectively reinforce the findings of the literature review, demonstrating that successful technology integration requires a strategic and adaptive approach that addresses organizational, cultural, and technological barriers. They illustrate the need for tailored implementation strategies, comprehensive training programs, and a culture of continuous improvement.

6. Implications and Recommendations

The analysis presented in this paper has revealed that successful technology integration in military organizations is contingent upon addressing a complex interplay of organizational, cultural, and technological barriers. The uneven adoption of advanced HRM technologies, as evidenced by the challenges faced in integrating LMS platforms with talent management systems, underscores the need for a more strategic and holistic approach. Based on these findings, the following recommendations are proposed:-

Policy & Organizational Recommendations

(1). **Establish Cross-Functional Implementation Teams**: Military organizations should create dedicated, cross-functional teams to oversee technology implementation. These teams should include representatives from various departments and ranks, i.e. HR, IT, operations, training and administration; ensuring buy-in from all stakeholders. This will facilitate better communication and coordination, addressing the organizational barriers highlighted in the IPPS-A exemplar.

(2). **Develop Comprehensive Digital Literacy Training Programs**: To bridge digital literacy gaps and foster a culture of technology acceptance, comprehensive training programs are essential. These programs should be tailored to the specific needs of different personnel groups and emphasize the practical benefits of using advanced HRM technologies.

(3). **Implement Phased Implementation and Pilot Programs**: Before full-scale implementation, military organizations should conduct pilot programs to identify/ address potential

issues. This phased approach, as demonstrated by the lessons learned from the IPPS-A initiative, will minimize disruption and maximize the chances of success.

(4). **Establish Continuous Feedback Loops**: Create mechanisms for ongoing feedback from personnel using the new systems. This feedback should be used to make necessary adjustments and improvements, ensuring that the technologies meet the evolving needs of the organization.

(5). **Foster International Collaboration and Standardization**: NATO and other international military alliances should continue to work towards establishing common standards and specifications for ADL and other HRM technologies. Encourage collaborative development and sharing of best practices to overcome interoperability challenges. Moreover, by practicing standardization in data recording/ communication procedures, equipment, operational procedures, and training modules will ensure compatibility across national boundaries.

6.1 Technological Solutions for HRM Enhancement

(1). **Implementation of an Integrated HR Information System**: Deploy a centralized HRIS to integrate recruitment, payroll, training, and performance management into a single system. Ensure interoperability with other military databases for seamless information flow.

(2). **Invest in Robust Cybersecurity and Interoperability Measures**

(a) Given the highly sensitive nature of military personnel data and operational information, investing in robust cybersecurity and interoperability measures is of paramount importance. Military organizations must prioritize the implementation of multi-layered security protocols, including advanced encryption, intrusion detection systems, and regular vulnerability assessments, to protect against cyber threats. This includes ensuring that all HR systems, especially those accessible remotely or through mobile devices, adhere to stringent security standards.

(b) Furthermore, ensuring system interoperability is crucial for seamless data exchange and collaboration both within and across military branches and allied forces. This requires adopting open standards and protocols that facilitate the integration of diverse systems, including HRIS, LMS, and talent management platforms.

(c) Military organizations should prioritize investments in technologies that support data interoperability, such as application programming interfaces (APIs) and data exchange platforms. This will allow for the efficient sharing of personnel data, training records, and performance evaluations, enabling better coordination and decision-making.

(3). **Tailor LMS Content for Deployed Environments**: When utilizing LMS platforms for deployed units, ensure that the content is accessible in low-bandwidth environments and optimized for mobile devices. Incorporate virtual simulations and interactive learning experiences to enhance engagement.

(4). **Leverage AI and Big Data Analytics for HR Decision-Making**: Artificial Intelligence (AI) and Big Data analytics can significantly improve military HRM by automating talent acquisition, predicting workforce needs, and enhancing decision-making. AI-driven tools can analyze personnel performance, identify skill gaps, and suggest targeted training programs. Predictive analytics can help in workforce planning by forecasting personnel shortages or deployment needs based on historical trends.

(5). **Adopt Cloud-Based HRM Solutions**: Cloud computing offers scalable and accessible HRM solutions, enabling military organizations to manage personnel data, payroll, training programs, and performance management from a centralized, secure platform. Cloud-based HR systems also allow real-time data access across various military branches, improving coordination and operational readiness. Additionally, cloud infrastructure enhances cybersecurity by enabling automated updates and encryption measures.

(6). **Integrate HRIS with Military Operational Systems**: To ensure real-time tracking of personnel and optimize resource allocation, HR Information Systems (HRIS) should be integrated with existing military operational systems. This integration allows commanders and HR personnel to make data-driven decisions regarding troop deployments, skill-based assignments, and personnel readiness assessments. Furthermore, integrating HRIS with military logistics and mission planning systems can enhance overall operational efficiency.

By implementing these recommendations, military organizations can enhance the integration of advanced HRM technologies, leading to improved personnel management, enhanced operational readiness, and a more adaptable and effective workforce.

Conclusions

This research has explored the challenges and opportunities associated with integrating advanced HRM technologies within military organizations. Through a review of existing literature and the analysis of focused exemplars, this study has identified key impediments to effective technology adoption, including organizational, cultural, and technological factors.

The findings reveal that while military organizations are increasingly adopting technologies such as HRIS, LMS, and Talent Management Platforms, the successful integration of these systems remains a significant challenge. Rigid organizational structures, cultural resistance to change, and concerns related to data security and interoperability pose substantial obstacles. However, the exemplars examined, including the US Army's IPPS-A initiative, the use of LMS platforms in deployed units, and NATO's ADL initiative, have provided valuable insights into both the challenges and potential benefits of technology integration.

To overcome these barriers and fully leverage the potential of advanced HRM technologies, military organizations must adopt a strategic and adaptive approach. This includes establishing cross-functional implementation teams, developing comprehensive training programs, investing in robust cybersecurity measures, and implementing phased implementation and pilot programs. Furthermore, fostering a culture of continuous improvement and establishing mechanisms for ongoing feedback are essential for ensuring that these technologies meet the evolving needs of the organization.

In conclusion, the integration of advanced HRM technologies offers significant potential for enhancing personnel management, improving operational readiness, and ensuring a more adaptable and effective military workforce. By addressing the identified barriers and implementing the proposed recommendations, military organizations can pave the way for a more technologically advanced and strategically aligned HRM framework, ultimately contributing to their overall mission success.

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RISK MANAGEMENT IN PUBLIC PROCUREMENT IN TUNISIA

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Abstract:
Risk management in Tunisian public procurement is vital to ensure the efficiency and transparency of public spending. Financial, technical, legal, and corruption risks can jeopardize project success. Rigorous risk identification, assessment, and the implementation of appropriate mitigation strategies are essential. Training and awareness-raising for stakeholders, the use of information technology, and public-private collaboration are levers to strengthen risk management. Concrete recommendations, such as improving the legal framework and strengthening institutional capacity, can contribute to improving the situation. Ultimately, effective risk management in public procurement is essential to guarantee the optimal use of public funds and the country's economic development.
***Keywords**:risk; procurement;public funds;costs; overruns.*

Introduction

Public procurement plays a vital role in Tunisia's economic and social development, accounting for a significant portion of public expenditure. Governed by a stringent legal and regulatory framework aimed at ensuring transparency, efficiency, and equity, these procurements are nevertheless subject to numerous risks that can jeopardize project success. Such risks include financial, technical, legal, and most notably, corruption. If not effectively managed, these risks can lead to cost overruns, delays, or even complete project failures, thereby compromising the optimal utilization of public resources.

In this context, risk management in public procurement has become a priority to guarantee project success and safeguard public interests. The fundamental question is: How can effective risk management in Tunisian public procurement contribute to transparency and efficiency in public spending while reducing instances of corruption and dysfunction?

Tunisia's economic and social progress hinges on the efficient allocation of public funds. However, the nation's public procurement system faces significant challenges, including corruption and mismanagement. This study aims to unravel the complexities of risk management in Tunisian public procurement, exploring strategies to enhance transparency, efficiency, and accountability in public spending.

This study seeks to explore this question in three parts. The first chapter will delve into the conceptual and regulatory framework of public procurement in Tunisia. The second chapter will focus on the identification and assessment of risks in public procurement, including the methodologies employed. Finally, the third chapter will examine mitigation strategies and monitoring mechanisms necessary for robust risk management.

1. Conceptual and Regulatory Framework

1.1 Introduction to Public Procurement

Public procurement is at the heart of public fund management and serves as a strategic lever for achieving Tunisia's development objectives. Public contracts can be categorized into three main types: works contracts, supply contracts, and service contracts.

A- Objectives of public procurement:

- Economic efficiency: Optimal use of public resources to ensure value for money.
- Transparency and anti-corruption: Public procurement aims to prevent favoritism and ensure equal opportunities among bidders, while adhering to international good governance standards.
- Support for the national economy: Public procurement can stimulate local businesses, foster innovation, and contribute to achieving social and environmental objectives (such as "green" public procurement).

B- Key actors in public procurement:

- Contracting authorities: Public bodies that issue calls for tender (central administrations, local authorities, public enterprises).
- Bidders: Economic operators who respond to calls for tender, whether local or foreign companies.
- Control bodies: Institutions such as the Court of Auditors or the National Anti-Corruption Authority (INLUCC) that oversee the regularity of processes.

1.2 Legislative Framework

Tunisia's legal framework has evolved to meet the modern demands of transparency and good governance. In addition to Decree No. 2014-1039, several other laws and decrees are significant:

- Decree No. 2018-416: Introduces modifications concerning the use of electronic platforms for calls for tender to enhance transparency and reduce the risk of manipulation or favoritism.
- Law No. 2017-10 on the reporting of corruption: This law aims to protect whistleblowers, a crucial tool for detecting irregularities in public procurement.
- HAICOP (High Authority for Public Procurement): It oversees all public procurement processes, issues explanatory circulars, and plays an advisory role. The legislative framework strives to align Tunisian practices with international best practices, including those recommended by the World Bank and the Organization for Economic Co-operation and Development (OECD).

1.3 Risk Management

In public procurement, risk management is imperative to ensure project success. Types of risks can be classified as follows:

- Financial risks: Budget overruns, cost underestimation, fluctuations in raw material prices.
- Technical risks: Delays in project execution, design or engineering errors, insufficient material quality.
- Legal risks: Contractual disputes, abuse of legal remedies, non-compliance with laws and regulations.
- Corruption risks: Collusion between parties, favoritism, conflicts of interest, lack of transparency in contract award. Proactive management of these risks can minimize financial losses and delays while improving the quality of results obtained.

2. Risk Identification and Assessment

2.1 Risk Identification

Risk identification involves detecting all internal and external events or factors that could potentially harm a project. The following techniques can be employed:

- PESTEL analysis (Political, Economic, Sociological, Technological, Environmental, and Legal): This tool enables a mapping of external risks, including regulatory changes, economic developments, and environmental pressures.
- Brainstorming: Gathering stakeholders to collectively identify potential risks.
- Historical data analysis: Examining past projects to learn lessons and identify recurring risks.
- Specific examples of risks in Tunisia include:
- Political instability: Can lead to project delays or cancellations.
- Difficulties in material procurement: Risks of price increases or shortages of raw materials.
- Coordination issues between actors: Risk of extended delays due to poor coordination among subcontractors or different organizations.

2.2 Risk Assessment

Risk assessment quantifies identified risks in terms of probability and impact. Evaluation criteria include:

Probability of occurrence: Assesses the frequency with which a risk could materialize.

Severity of impact: Measures the financial, legal, or technical consequences of the risk occurring.

Evaluation tools:

Risk matrix: A table that cross-references probability and impact to classify risks.

Monte Carlo analysis: A simulation technique that can predict various possible outcomes of a project and assess the associated risks for each scenario.

2.3 Risk Prioritization

Risk prioritization allows for focusing efforts on critical risks. Risks are ranked in order of importance according to their criticality, using techniques such as:

- Pareto analysis (80/20): This approach targets the 20% of risks that account for 80% of problems.
- Gantt chart: Used to visualize the impact of risks on project planning.

3. Mitigation Strategies and Monitoring

3.1 Mitigation Plans

Mitigation strategies aim to reduce the impact or likelihood of risks occurring. Several types of strategies can be considered:

- Protective contractual clauses: Incorporating penalty clauses for delays, requirements for bank guarantees, or price revision clauses to address economic fluctuations.
- Risk transfer: Utilizing specific insurance to cover financial or legal risks.
- Supplier diversification: Reducing dependence on a single supplier to minimize supply risks.

3.2 Risk Monitoring

Risk monitoring should be continuous throughout project execution. Tools and techniques used include:

- Risk management dashboards: Real-time monitoring of risk status and corrective measures.
- Regular audits: Periodic verification of the compliance of risk management processes.
- Software tools (ERM, Enterprise Risk Management): Integrated management systems enable automated monitoring and alerts in case of increased risk.
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3.3 Training and Awareness

Training is a cornerstone of risk management, as it ensures that all public procurement stakeholders are aware of risks and know how to address them. Specific training programs should be established for:

Project managers: Strengthening their risk management skills.

Legal teams: Training on legal developments and dispute resolution.

Private sector actors: Raising awareness of the specific risks of public procurement to foster better cooperation with contracting authorities.

Initiatives in Tunisia: HAICOP organizes seminars and workshops to raise awareness among stakeholders about good risk management practices. INLUCC also plays a role in anti-corruption training, a crucial aspect of risk management in public procurement.

Conclusion

Risk management in public procurement is an essential process to ensure the transparency, efficiency, and integrity of public projects, particularly in an economic and political context where public funds are limited and subject to increasing pressure. The risks associated with these procurements are manifold—financial, legal, operational—and can severely compromise project execution if appropriate mechanisms are not in place.

Risk identification and assessment tools, such as internal and external audit methods, risk mapping, and lessons learned analysis, enable the detection of potential vulnerabilities upstream and the consideration of solutions to anticipate them. These tools provide public authorities with a clear view of the threats they face and contribute to the implementation of effective prevention and mitigation strategies.

Prevention strategies, including anti-corruption measures and e-procurement, help to strengthen transparency and limit fraudulent practices. The implementation of contingency plans and the capacity building of public and private actors also optimize the management of unforeseen events and ensure better project execution.

Finally, post-contract monitoring and control mechanisms, such as continuous monitoring and independent audits, play a central role in overseeing public procurement. The role of external stakeholders, such as civil society and international institutions, provides additional oversight and strengthens the accountability of contracting authorities.

For Tunisia, strengthening risk management in public procurement remains a significant challenge but also an opportunity to modernize its public governance. Ongoing efforts in transparency, auditing, and control must be continued and intensified to ensure that public resources are managed with integrity and efficiency. This requires enhanced collaboration among various stakeholders, better use of digital tools, and a culture of transparency rooted in all spheres of public management.

Ultimately, the establishment of a rigorous risk management framework in public procurement is a prerequisite for ensuring the optimal use of public funds, fostering economic growth, and strengthening citizens'

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FAKE NEWS AND THE TUNISIAN ARMY

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Abstract:
The rise of fake news has significantly impacted military institutions, including the Tunisian army, by undermining public trust and operational effectiveness. This research examines the relationship between misinformation and the military, focusing on the Tunisian context. The study highlights the Tunisian army's proactive strategies, such as legal frameworks, collaboration with media, and cybersecurity measures, to combat misinformation. Case studies illustrate the consequences of fake news, including strained diplomatic relations and public confusion. The paper also discusses challenges like resource constraints and evolving technologies, proposing solutions such as media literacy and international cooperation. Ultimately, the research underscores the importance of vigilance and adaptability to safeguard military credibility in the digital age.
Keywords:*fake news; manipulation; information; misinformation; military.*

Introduction:

In recent years, the phenomenon of fake news has increasing impacted various sectors, including defence and military operations. This research explores the relationship between fake news and the Tunisian army, examining how misinformation can undermine military integrity and operational effectiveness, as well as the strategies employed by the army to combat such threats.

1: Understanding fake news:

1.1:.Definition

Fake news refers to false or misleading information presented as news, often aimed at influencing public opinion or obscuring the truth. Generally speaking, fake news is any false information disseminated on the internet, whether or not it is indented to harm a person or organization, or to serve a cause or person. A distinction is made between:

- Satirical or parodic information,
- Faked headlines,
- Misleading content,
- Content taken out of its original context,
- Plagiarized content,
- Content manipulated to mislead the reader and, fabricated content

For Tunisian army, fake and misleading news aimed at undermining the morale of the army is considered hostile acts that must be addressed in a manner guaranteed by Tunisian law.

1. 2: Historical context:

The concept of misinformation is not new; however, the rise of social media has amplified its reach. Historical examples of fake news include propaganda during wartime, showcasing how it has been used to manipulate perceptions and behaviours.

2. The role of the military in society

2.1: Overview of the Tunisian army:

The Tunisian army, established in 30 Jun 1956 plays a great role in national security and has participated in various peacekeeping missions internationally. After the revolution of 14 January 2011, the Tunisian army played a leading role in maintaining security, public and private property, which strengthened its status among the Tunisian people.

2.2: Importance of trust in military:

Surveys around the world report exceptionally high levels of support for the military. This is particularly relevant for countries in transition from authoritarian rule to democracy, where militaries can play a vital role for democratic consolidation or autocratic backsliding .Trust in military institutions is vital for national stability. Fake news can erode this trust, making it essential for the military to maintain its integrity and credibility in the eyes of the public. From this point of view, it seems necessary to fortify the military institution against rumours and fake news.

3. Impact of fake news on military operations:

3.1: Reasons for the spread of fake news

The major factors that contribute to the dissemination of fake news about the military are:

- Disinformation operations by state, terrorist entities, or adversarial countries to undermine or control public sentiment.
- Social media gives a platform to fake news whereby it goes viral within hours; sensationalism and emotions play key content.
- In their race for exclusive information and scoops, media outlets do not exercise caution in investigating information, which leads to the spread of fake news.
- The people are made to believe and share untruths due to confirmation bias and emotional manipulation.
- Sensationalism of the media through clickbait headlines especially when dealing with such sensitive military issues can sometimes warp the facts.
- The fog of war — in other words, the confusion and misinformation during a conflict — means that facts are often not just scarce but also badly misinterpreted.
- In an online setting where sources remain nameless, establishing credibility in any military-related assertion becomes a veritable challenge.
- Low literacy levels in the media mean that people will take news at face value without proper scrutiny or even fact-checking whether it is true or not.
- Political polarization causes fake news to be sent attacking or undermining military institutions that are aligned with opposing views.
- Economic incentives for the creators of fake news, who profit from sensational stories-especially military stories.

Combating fake news requires better media literacy, improved fact-checking, and regulation of digital platforms.

3. 2: Case studies:

Several instances of fake news globally have demonstrated its capacity to disrupt military operations and erode public trust. During the Arab Spring, widespread misinformation fuelled confusion and mistrust among both civilians and military personnel, complicating response efforts and weakening institutional cohesion. During Tunisia's revolution (dec2010-jan2014), false narratives spread rapidly via social media, undermining trust in institutions especially the military institution. The concrete example are "The rumours falsely claimed the military was firing on

protesters in Tunis, this intensified public anger and confused security forces, delaying coordinated responses".

A leaked U.S. diplomatic cable noted: "misinformation is paralysing decision-making chains" ((WIKILEAKS, 2011) - cable ID: 10 TUNIS 14- key quote: "Rumours spread via social media claimed the army was shooting protestors in Tunis on January 9-10, 2011. These falsehoods amplified public fury and created confusion within security forces, hampering crisis responses"). The same topic is addressed by the American academic JAMES GELVIN in his research under the title: "The Arab uprising: what everyone needs to know-2012 oxford university press page 45".

More recently, on May 20, 2024, the Italian newspaper "La Repubblica'' published an article titled "Russian Military Aircraft in Tunisia, US Alerts: 'Moscow is Deploying'," which claimed foreign military presence in Tunisia, this sparked controversy and concern. In response, Tunisian President Kais Saied strongly rejected the allegations, affirming that Tunisia does not host any foreign military bases and praising the sacrifices and dedication of the Tunisian armed forces in defending national sovereignty. The incident highlights how fake news can strain diplomatic relations, undermine military credibility, and sow public confusion. It can also be argued that information warfare, which relies on misleading and demoralizing the enemy, is a decisive factor in managing the battle and achieving specific political objectives.

3. 3: Psychological warfare:

Fake news serves as a tool for psychological warfare, aiming to demoralize troops or sway public against military actions.

4. The Tunisian army's response to fake news:

4. 1: Military strategies and policies:

The Tunisian army has developed several strategies to counter misinformation, including digital outreach and collaboration with media organisation to clarify false narratives. The Tunisian army has also engaged in the state's policy of combating rumours and fake news by honouring the Principe of the right of access to information and promoting the principle of transparency and accountability through organic law No.22 of 2016 dated March 24, 2016. The spokesperson of the Tunisian Ministry of national defence is responsible for answering all inquiries from the media and all official bodies that request information or clarifications.

4. 2: Role of the Defence Intelligence and Security Agency (DISA):

The Defence Intelligence and Security Agency (DISA) is a Tunisian military institution affiliated with the Tunisian ministry of National defence and concerned with military security and intelligence affairs. The draft decree No.4208 of 2014 dated November 20, 2014 was approved, creating a public institution under the supervision of the president of the republic of Tunisia, supreme commander of the armed forces, and the ministry of national defence, and giving it the current name. The DISA through its various structures , particularly those working in the field of cybersecurity and combating electronic crimes , is responsible for combating rumours and fake news in times of peace and war , and for reporting what it deems to be threatening state security and public order to military courts, which are responsible for prosecuting the accused before their competent departments.

4. 3: Approach to combat fake news (STRATCOM):

Tunisian army was one of the first to engage in combating fake news. Stopping fake news is a multifaceted process that involves various strategies and actions by individuals, organizations, and governments. In our country, we can say that the Tunisian army has been a pioneer in the fight against fake news when the Tunisian state has adopted a communication strategy (STRATCOM) based on eight steps to look for this purpose

❖ Media literacy education:

- Promote critical thinking; teach individuals, especially students, how to critically evaluate sources recognize bias.
- Workshops and training; conduct workshops that focus on identifying fake news, understanding how misinformation spreads, and analysing media.

❖ Fact-checking organizations:

- Support fact –checkers; encourage the growth and accessibility of independent fact-checking organizations by concluding agreements with friendly countries that include training and developing modern methods of detecting fake news, the Tunisian state also provides important subsidies and encouragement to private initiative holders.
- Fact –checking tools; provide tools and resources for the public to verify claims, such as Snopes, Factcheck.org, and politiFact.

❖ Digital literacy for all Ages:

- Curriculum integration; integrate lessons on digital literacy into school curricula, emphasizing the importance of reliable information sources.
- Public campaigns; launch campaigns to raise public awareness about fake news and how to avoid it.

❖ Developing reliable sources:

- Encourage credible journalism; support a free, fair and credible press.
- Transparency; encourage news organizations to be transparent about their sources and fact-checking processes.

❖ Algorithm and policy adjustments by tech platforms:

- Content moderation; social media platforms implement stronger content moderation policies to reduce the spread of fake news.
- Algorithm changes; adjust algorithm to prioritize credible news sources and limit the reach of misinformation.

❖ Community engagement and reporting:

- Empower communities; mobilize communities to actively report fake news and misinformation encountered online.
- Peer support Networks; create platforms for individuals to discuss and verify news with peers before sharing.

❖ Crisis communication:

- Swift responses; government and organizations should provide accurate information swiftly to counter misinformation during crises.
- Clear messaging; develop clear and concise messaging to dispel common.

❖ Collaboration and partnerships:

- Multi-stakeholder initiatives; collaboration with media organizations, tech compartment NGOs, and governments to tackle the problem collectively.
- International cooperation; share successful strategies and best practice across borders to combat global misinformation.

5. Analyse of recent incidents:

5. 1: Examples of fake news affecting the Tunisian army:

Recent instances where fake news spread misinformation about military activities illustrate the challenges faced by the Tunisian army, such as rumours of military coups or exaggerated reports of military capabilities. In other way, some unreliable web pages deliberately issue fake news about the army and its activities and mislead the Tunisian public opinion. These pages are easily detected and addressed with the available technical and legal means available, especially through the

cybercrime law (Decree No.54 of 2022 dated September 13, 2022 on combating crimes related to information and communication systems). Through the article 04 of this law "the competent departments of the ministries of national defence and interior are responsible for implementing the authorizations to access their respective information systems , data and stored data".

5. 2: Public reaction and implications:

Public reaction to such misinformation can lead to protests or decreased trust in Military forces, demonstrating the need for proactive communication from the military. In Tunisia, the national army enjoy a good reputation among the general public, which has full confidence in its armed forces. In some cases of fake news, the media usually ask for clarification or information from the official body of the ministry of national defence, represented by the official spokesperson of the ministry of defence.

6. The future of information warfare:

6. 1: Challenges faced by the army:

The rapid evolution of technology presents ongoing challenges, as the tools for creating and disseminating fake news become more sophisticated. Compounding this, the army faces resource shortages, political volatility and eroded public trust – legacies of Tunisia's transitional period:

- Resource constraints: limited budgets for cybersecurity tools and digital literacy training
- Political interference: post-revolution instability led to fragmented command structures.
- Social distrust: Fake news has contaminated the relationship between the army and the population.
- Cross-border threats: foreign actors exploited social media to spread destabilizing content.

6.2: Potential solutions:

Implementing robust cybersecurity measures and fostering partnerships with technology firms can help the Tunisian army combat the spread of fake news effectively. Tunisia does not appear to have a specific strategy in place to combat cybercrime and fake news. In 2013 the "Agene Technique des Telecommunications" was created to provide "technical assistance to judicial investigations concerning the fight against cybercrime''. In 2022, decree-law no.2022-54 introduced provisions on cybercrime. Tunisia, on the other hand, has had an IT security strategy in place since the late 90s, including:

- January 2003: creation of the National Agency for Computer security
- February 2004: promulgation of a law on IT security (Law n.2004-05 of February 3, 2004 and in associated regulatory acts)
- September 2005: Launch of tunCERT (computer emergency response team)
- National cybersecurity strategy 2020-2025: This strategy aims to direct and manage national cyberspace, identifying the parties involved and supporting coordination between them. It also aims to prevent cyber threats and improve the country's resilience to these threats by strengthening national capabilities, accelerating awareness and protecting vital information infrastructures.

As for the Tunisian army the solutions are adopted after analyzing the strengths and weaknesses of the military force itself, for that military leaders must secure the external and the internal work environment and educate individuals about the danger of fake news, and from there, the foundation for a long-term and continuous action plan begins, which is based mainly on the following points:

- Run awareness-raising campaigns to explain the dangers of disinformation and the techniques used by manipulators.

- Train military personnel to recognize fake news, check sources and cross-check information. This task is carried by the DISA by organizing awareness sessions and seminars at various academies and military barracks in Tunisia.
- Encourage military person to question the information they receive and check the facts before sharing it.
- Communicate proactively with troops to disseminate accurate and official information, in order to counteract fake news.
- Use various communication channels (social, intranet, etc.) to reach as many staff as possible.
- Encourage collaboration between the various players in the fight against fake news (technology companies, fact-checkers, and academic institutions).
- Share best practice and resources in the fight against fake news.
- Clearly communicate errors and manipulations, presenting the facts in a transparent manner, this is where the important role of the armed forces spokesperson comes into play.
- developing cooperation relations with the armies of friendly countries around the word, including NATO forces, to benefit from their expertise in the field of cybersecurity, combating fake news and following all developments in the same field, which is what the Tunisian armed forces are keen on.

Conclusion:

The spread of fake news poses a serious threat to the credibility and operational integrity of military institutions, including the Tunisian army. It undermines public trust and can destabilize national security. The Tunisian army has recognized the danger and taken proactive steps to address it through legal frameworks, media collaboration, and cybersecurity strategies. Institutions like DISA play a crucial role in detecting and countering misinformation. STRATCOM efforts have helped enhance media literacy and public awareness.

Despite this, evolving technologies and social media platforms continue to amplify the challenge. Effective crisis communication and prompt fact-checking are essential tools. Regional and international partnerships are key to strengthening defences. Continuous training for military personnel helps build resilience against manipulation. Ultimately, safeguarding military credibility in the information age requires vigilance, coordination, and adaptability.

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TRANS-EUROPEAN TRANSPORT NETWORKS, A FACTOR OF CONNECTION, SECURITY AND REGIONAL DEVELOPMENT

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Abstract:
This paper considers the geopolitical, economic and security realities that oblige the Romanian state to apply new policies to ensure accessibility with its neighbours, with the member countries of the European Union, but also with the NATO member countries. Shortening the distances from the starting point to the destination means saving time, energy and road safety. Romania must develop and modernize its transport network according to the new European model. Through judicious planning of the road, railway and navigation infrastructure, European transport corridors will be created, with a strategic importance for economic, social and defence development in case of conflicts. By investing in transport infrastructure, it can become a pillar of Romania's economic development, as well as of the country's defence.

***Key words**: traffic safety, sustainable mobility, trans-European transport network, economic cohesion, cross-border connections, geopolitical context;*

1. Introduction

Romania, as a member state of the European Union since 2007, must increase the speed of implementation of investment works on transport infrastructure. This is a priority for Romania's connection to national and international transport networks.

Transport networks represent increased access to all regions nationally and opportunities for economic development on the European Union and extra-EU markets.

In the current geopolitical context, with conflict situations up to the national border, intra-European transport networks represent opportunities for defence and security.

The European Union's transport policies provide for the implementation of integrated European networks with a completion date of 2030 (TEN-T Core) and global networks with a completion date of 2050 (TEN-T Comprehensive) [9].

In 2016, Romania adopted the General Transport Master Plan and the Implementation Strategy, which have been updated [3].

The European transport policy [1], implemented in the related Romanian legislative documents, prioritizes the development of the national transport network. The EU norms and standards refer to road, rail, air and naval transport, in compliance with the European Green Deal [4].

The recovery of the gaps and deficits in the field of transport infrastructure in Romania represents national priorities; their non-compliance and non-realization slows down economic development. On an integrated level, it is an element of economic development but also a strategic element of NATO defence in the event of armed interventions (in case of necessity).

2. Trans-European transport networks

The Trans-European Transport Networks (TEN) have the well-defined purpose of connecting the regions of the European Union, in order to achieve the objectives of economic, social and territorial development and, in the current context regarding Ukraine, to defend the EU and NATO space. The aim is thus to achieve stability between sustainable economic development and the requirements of quality and balance in transport; the aim is to eliminate bottlenecks, develop safer and less polluting technologies, harmonize sanctions and coherent pro-active policies.

The opening of borders within the European Union has favoured unprecedented mobility possibilities for European citizens. Passenger and goods transport create jobs in the field, generating opportunities for economic development, dynamism and strengthening social cohesion and prosperity.

The European Commission aims to transform the system of roads, railways, airports and waterways into a single TEN-T transport network. For the 2014-2022 period, the TEN-T network envisaged projects for connection, materialized in:

- 83 main European ports with rail and road connections,
- 37 main airports with rail connections in large cities,
- 15,000 km of railway for high-speed traffic,
- 35 major cross-border projects to reduce congestion.

The map of trans-European transport corridors is presented as shown in Fig. 1 and Tab. 1.

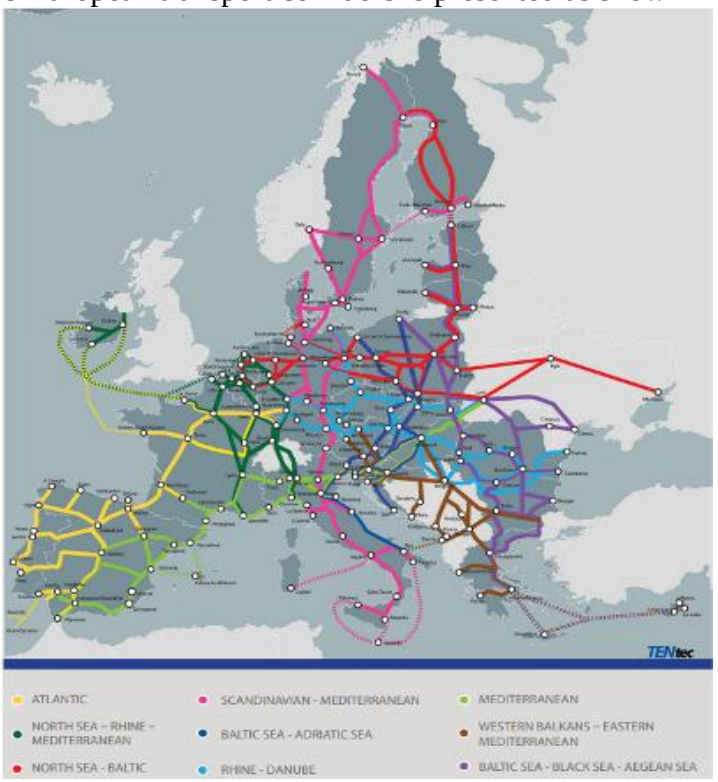

Fig.1. Map Finder Chart for European Transport Corridors [13]

Corridor	Name	From	Via	To	Length, km
1.	Baltic Sea-Adriatic Sea Corridor	Gdynia	Viena	Ravenna	2400
2.	North Sea-Baltic Sea Corridor	Helsinki	Warsaw	Anvers	3200
3.	Mediterranean Corridor	Algeciras	Lyon-Venice	Miskolc	3000
4.	The Orient Corridor/Eastern-Mediterranean Sea	Hamburg	Budapest-Sofia	Nicosia	3700
5.	Scandinavian-Mediterranean Corridor	Helsinki	Copenhagen-München	Valletta	4858
6.	Rhine-Alpine Corridor	Genova	Köln	Rotterdam	1300
7.	Atlantic Corridor	Lisbon	Vitoria-Gasteiz	Strasbourg	8200
8.	North Sea-Mediterranean Sea Corridor	Dublin	Cork-Le Havre	Bruxelles	933
9.	Rhine-Danube Corridor	Strasbourg	Budapest	Constanța	2137

Table 1. The Main Corridors of the TEN-T Network [14]

In June 2024, the European Commission adopted a revised regulation on the construction of the trans-European transport network (TEN-T). The aim is to ensure sustainable, fast connectivity without physical blockages or interruptions.

It is a response to the mobility of citizens, the transport of components of productive units and mobilities in the event of problems of necessity and defence. In addition to the initially foreseen deadlines, namely 2030 for the core network and 2050 for the comprehensive transport network, an intermediate deadline of 2-4- was established for the implementation of the extended core network. This aims to complete major projects and works, especially in cross-border areas, such as the Budapest-Bucharest or Copenhagen-Hamburg railway connections.

Russia's war of aggression against Ukraine has determined the extension of the transport corridors (TEN-T) towards Ukraine and the Republic of Moldova [7].

The European Commission has taken measures to help Ukraine in the field of transport; "solidarity corridors" have been created for the export and transport of cereals from Ukraine, but also for the import of essential products, humanitarian aid and raw materials necessary for the production process.

The four transport corridors proposed between the EU and Ukraine and the Republic of Moldova will improve the connection of these countries to the EU, increase transport capacity and implicitly support their economic development, increasing competitiveness.

Given the current geopolitical context and the position of Belarus regarding the armed conflict provoked by Russia against Ukraine, it was decided that Russia and Belarus should be excluded from the TEN-T map network.

Transport connections between the EU and Russia and Belarus have been downgraded from core networks to global networks with a completion date of 2050.

Until 2020, passenger and freight transport activity was experiencing constant growth. The figures forecast before the Covid 19 pandemic were different - decreasing - from what had been estimated by the European Commission's specialized committees. The most affected were air and rail passenger transport.

According to data published by Eurostat, in 2019, 11.6 million workers worked in the transport sector, in 2020 10.8 million workers worked, and in 2021 the EU transport sector only had 6 million workers [5].

After the Covid 19 pandemic, the EU economy entered a gradual recovery process, including the chapter on passenger and freight transport.

The European Commission has selected 94 projects [10, 11] under the Connecting Europe Facility (CEF) to promote sustainable mobility and better connect Europe's regions from east to west and from north to south (July 2025) [2].

The value allocated to these projects is 2.8 billion euros. Rail transport has been allocated 77% of the amount for modernization and high-speed railway lines. Part of the investments will be allocated to maritime transport and increasing the degree of interconnection on Europe's inland waterways. It is also aimed at creating urban mobility hubs and creating connections between different modes of transport. Solidarity corridors between the EU and Ukraine will be strengthened.

According to the European Commission's press release, the modernization and expansion of transport routes will increase the economic capacity of the EU internal market, minimize pollution sources, secure and ensure faster transport in case of urgent interventions in the context of current geopolitical realities; they are strategic and solidarity investments [6].

258 applications were submitted and 94 projects were selected. Romania qualified with 3 projects, namely:

- electrification of the Iasi-border (RO) - Ungheni railway line. It will increase cross-border transport capacity with the Republic of Moldova, reducing transport times;
- rehabilitation of the Ploiesti-Focsani railway route. It will increase transport safety and improve connections with neighbouring third countries, Moldova and Ukraine;
- construction of a secure parking lot on the E60 highway in Ploiesti.

The new European transport model obliges Romania to modernize its own network, which will lead to a positive evolution of the economy.

At European level, the strategy of redistributing traffic on certain lanes, shortening departure-destination distances, has been developed and partially implemented.

Romania, as part of the EU, is expanding and modernizing its transport networks:

-Corridor IV starts from Vienna-Budapest-Belgrade-Black Sea.

-Pan European Transport Corridor No. IV runs through the Nadlac-Arad-Timisoara-Lugoj-Deva-Sibiu-Ploiesti-Bucharest-Cernavoda-Constanta areas in Romania.

-Pan European Transport Corridor No. IX, Giurgiu-Bucharest-Ploiesti-Buzau-Bacau-Iasi-Sculeni provides access to the Republic of Moldova, connecting the South-North area.

In 2021, the European Commission extended the European Master Plan for Transport (TEN-T). Romania is included in two corridors:

-Corridor VII: Rhine-Danube in expansion, which will connect Romania to the Black Sea and Germany, passing through Bulgaria-Serbia-Hungary-Slovakia-Austria-Czech Republic.

The Baltic Sea-Black Sea-Aegean Sea corridor in the North-South direction of the eastern EU states. It will connect Poland, Slovakia, Hungary, Romania, Bulgaria and Greece.

The national strategic transport plan provides for the development of road networks:

-6641.1 km of motorway and expressway road network, bypasses,
-2900.5 km of primary networks,
-3723.6 secondary networks.
For railway networks, the following are proposed:
-3274.8 km of primary networks,
-1228 km of secondary networks.

Romania, as a NATO member state, is part of the NATO defence exercises. For the smooth movement of military structures and equipment, the infrastructure on the movement route was inspected and it was found that portions of the infrastructure do not meet the requirements. The Ministry of National Defence concluded that some access roads and bridges require urgent repairs, works that were assumed by the Ministry of Development [12].

Also, considering that Romania is both an EU member state and NATO, it must ensure road infrastructure for economic development but also in case of its use, if necessary, by military structures. The European Commissioner for Transport announced that Europe "will modernize the transport network to facilitate military mobility" [15].

In the event of a military conflict with Russia, says Commissioner Apostolos Tzitzikostas, "over 500 infrastructures must be modernized, in consultation with the Atlantic Alliance, around four military corridors. This includes widening or building new bridges, adapting transport networks to become strategic roads."

3. Conclusion

For the proper functioning of Romanian society, the economy and to guarantee safety in society, ensuring transport infrastructure is a vital resource.

All sectors of the economy, agriculture, public health, urban infrastructure, emergency and defence services, are also dependent on transport infrastructure. In the event of natural disasters or hostile actions, this component plays a crucial role.

In the current geopolitical context, coherence in the planning and execution of transport infrastructure is a necessity and an urgency for Romania. Recovering the deficit recorded in this area can be achieved by prioritizing investments, by concentrating institutional, financial and political efforts.

The Strategic Investment Plan in Transport Infrastructure [8] of Romania has been correlated with the European political framework and complies with the European Green Pact [4].

Romania must increase the efficiency of investments in transport infrastructure in European and national interest, oriented towards increasing national and international connectivity; it must catch up with the gap and delays in the development of transport infrastructure compared to other European countries to modernize European and national connectivity.

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OPTIMIZATION OF MILITARY TRANSPORT CORRIDORS: A CRITICAL DETERMINANT OF ARMENIA'S NATIONAL SECURITY

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Abstract

This white paper examines the strategic imperative of optimizing military transport corridors for the republic of Armenia. In light of recent regional conflicts and geopolitical challenges, we analyse infrastructure modernization requirements, technological solutions, and international cooperation frameworks necessary to enhance Armenia's military mobility capabilities. The document provides actionable recommendations based on global best practices adapted to Armenia's unique geographical and political context

Keywords:security; transport corridors; geopolitical challenges; regional conflicts.

1. Introduction

Throughout history, the success of military operations has depended not only on battlefield tactics but also on the efficient movement of troops and supplies. Historical examples like the Roman road networks and the Normandy landings illustrate this point, and highlights that in today's world, with its advanced technology and complex geopolitical situation, optimizing military transport corridors is still very important for a nation's security. This means that a nation's ability to move its military forces and resources effectively is just as crucial as having well-trained soldiers and advanced weapons. For example, the Roman Empire's extensive road system allowed its legions to move quickly across vast distances, enabling them to conquer and control a large territory. Similarly, the Allied forces' success in the Normandy landings during World War II depended heavily on their ability to transport a massive amount of troops and equipment across the English Channel. In today's context, with complex geopolitical challenges and advanced military technologies, the importance of efficient military transport corridors remains undiminished.

Armenia's geographical location and regional conflicts present unique challenges to its national security. As a landlocked country, Armenia lacks direct access to the sea, which means it relies on neighbouring countries for trade and transportation routes. This dependence can make it vulnerable to political and economic pressures from these neighbours. The South Caucasus region, where Armenia is situated, has historically been marked by political instability and ethnic conflicts, including the ongoing Nagorno-Karabakh conflict with Azerbaijan. This conflict has not only resulted in territorial disputes but has also affected Armenia's relations with Azerbaijan and Turkey, which supports Azerbaijan. The closure of borders and disruptions to transportation routes have further complicated Armenia's economic and security situation.

Efficient transport networks are vital to Armenia's national security for several reasons. First, they enable the rapid deployment of military forces and equipment to respond to external threats such as border incursions or regional conflicts. Second, they are essential for sustaining military operations by ensuring a continuous supply of vital resources like ammunition, fuel, and medical

supplies. Third, they play a crucial role in maintaining internal stability by facilitating the movement of security forces to address domestic unrest or natural disasters. Finally, a well-developed transport network can deter potential adversaries by signalling Armenia's readiness and capability to defend itself. Conversely, if Armenia fails to prioritize the development and maintenance of its transport infrastructure, it could be more vulnerable to both external and internal threats. A lack of efficient transport networks could hinder its ability to respond effectively to security challenges, undermine its defence capabilities, and compromise its overall national security.

This essay will analyse the current state of Armenia's transport infrastructure, identify key challenges and vulnerabilities, propose strategies for optimization and resilience, and ultimately, assess the implications for Armenia's national security.

2. The Strategic Importance of Efficient Military Transport Corridors for Armenia

Rapid Force Projection and Mobilization: Efficient transport corridors are crucial for enabling Armenia to respond swiftly to military situations. This highlights the importance of being able to move troops and equipment rapidly to deal with various scenarios such as border incursions, regional conflicts, or internal threats. The ability to quickly deploy forces to strategic locations can be decisive in containing conflicts, protecting territorial integrity, and maintaining national security. A well-developed transport network ensures that military assets can be mobilized and positioned effectively, providing a significant advantage in times of crisis. For instance, in the event of a border incursion, rapid deployment of forces to the affected area can help to contain the situation, prevent further territorial losses, and protect the civilian population. Similarly, in regional conflicts, the ability to quickly move troops and equipment to strategic locations can be critical in achieving military objectives and safeguarding national interests.

Sustaining Military Operations: Reliable transport networks are vital for maintaining military operations over extended periods. This necessity involves ensuring a continuous and secure flow of essential supplies, including ammunition, fuel, and medical equipment, to support troops in the field. Efficient transport corridors play a pivotal role in guaranteeing that forces have the resources they need to operate effectively and maintain their readiness. The text also acknowledges the complexities associated with supplying forces in challenging terrains, such as mountainous regions, which can hinder logistical operations and necessitate specialized transport solutions. For example, during a prolonged conflict, a steady supply of ammunition and fuel is critical to maintain combat effectiveness. If supply lines are disrupted due to damaged infrastructure or enemy action, forces may be unable to sustain operations, leading to potential defeat. Similarly, ensuring the timely delivery of medical supplies can be a matter of life and death for wounded soldiers, directly impacting morale and the overall success of the mission.

Internal Security and Stability: Transport networks are essential not only for external defence but also for maintaining order within Armenia. Efficient transport infrastructure enables the rapid deployment of security forces to manage internal unrest, respond to natural disasters, and handle other emergencies. This mobility is crucial for law enforcement agencies to maintain public safety, ensure timely intervention in crisis situations, and uphold the rule of law. For example, in the event of a natural disaster such as an earthquake, efficient transport infrastructure is essential for the rapid deployment of emergency response teams, delivery of humanitarian aid, and evacuation of affected populations. Similarly, in situations of civil unrest, the ability to quickly move security forces to affected areas can help to contain the situation, prevent escalation, and protect civilians.

Deterrence and Power Projection: A robust transport infrastructure can significantly enhance a nation's deterrence capabilities and its ability to project power. For instance, a country

with well-maintained roads, railways, and airports can quickly mobilize and deploy its forces, signalling its readiness to respond to any potential aggression. This capability can deter potential adversaries from initiating hostilities, as they know the country can respond swiftly and decisively. Moreover, efficient transport networks can also facilitate the deployment of forces for peacekeeping operations, humanitarian missions, or participation in international coalitions, thereby enhancing a country's influence and standing on the global stage.

3. Analysing Armenia's Current Military Transport Infrastructure and Key Challenges

Armenia's transport infrastructure, comprising roads, railways, and airports, faces significant challenges that affect its ability to support military operations and overall national security. The country's mountainous terrain complicates the construction and maintenance of transport networks, leading to higher costs and longer timelines. This terrain also creates bottlenecks and vulnerabilities, as transport routes are often limited to narrow passages and winding roads that can be easily disrupted or targeted.

Furthermore, Armenia's landlocked status and its reliance on neighbouring countries, particularly Georgia and Iran, for access to seaports and trade routes, expose it to external dependencies. Political tensions or border closures with these countries could disrupt critical supply lines, affecting the country's ability to sustain military operations and respond to emergencies.

Several shortcomings in Armenia's transport infrastructure further exacerbate these challenges. Limited capacity, poor maintenance, aging infrastructure, and vulnerability to natural disasters such as earthquakes and landslides all contribute to the inefficiency and unreliability of the transport network. These factors hinder Armenia's ability to move troops and supplies efficiently, which in turn affects its capacity for rapid force projection, sustained military operations, internal stability, and deterrence.

To address these issues, Armenia needs to adopt strategies that focus on both optimization and resilience. Infrastructure development and modernization are crucial, including upgrading existing infrastructure, constructing alternative routes, and integrating advanced technologies to improve efficiency and capacity. Diversifying transport options, such as investing in military airlift capabilities and unmanned aerial vehicles (drones), can reduce reliance on vulnerable ground routes and provide more flexible and rapid deployment options.

Strengthening regional cooperation with neighbouring countries, where feasible, can help to secure transport corridors and facilitate transit agreements, reducing the risks associated with external dependencies. However, this must be approached cautiously, considering the complex geopolitical landscape of the region.

Enhanced security and protection measures are also essential to safeguard transport corridors against both physical and cyber threats. This includes increased surveillance, regular patrolling, and investments in cybersecurity infrastructure to protect critical transport systems from attack.

Finally, optimizing logistics and supply chain management is vital to ensure the smooth and efficient flow of goods and supplies. This involves improving inventory management, warehousing, and distribution systems, and adopting modern technologies to enhance supply chain visibility and resilience.

Effectively implementing these strategies will have significant implications for Armenia's national security. By improving its transport infrastructure and logistics capabilities, Armenia can enhance its ability to respond to threats, maintain stability, and project power in the region. This will strengthen its defence capabilities, improve its resilience to external and internal challenges, and contribute to its overall security and stability.

4. Identifying Vulnerabilities and Potential Threats to Military Transport Corridors

Geopolitical Instability: Regional conflicts and political tensions in the South Caucasus region pose a significant threat to Armenia's transport corridors. The ongoing Nagorno-Karabakh conflict with Azerbaijan, for example, has led to border closures and transport disruptions, hindering the movement of goods and people. To illustrate, the closure of the Lachin Corridor, the only road connecting Armenia to Nagorno-Karabakh, by Azerbaijan in December 2022, created a humanitarian crisis and disrupted the supply of essential goods, including food and medicine. This blockade demonstrated the vulnerability of Armenia's transport routes to political pressure and conflict in the region (1). Additionally, political instability in neighbouring countries, such as Georgia, can also affect Armenia's transit routes and trade agreements. These factors can disrupt transport routes, jeopardize transit agreements, and potentially lead to transport infrastructure being targeted during conflicts, all of which can have severe consequences for Armenia's economy and national security.

Cyber Threats: Cyberattacks pose a growing threat to transport systems globally, and Armenia is no exception. These attacks can target critical infrastructure control systems, such as those managing transport networks, air traffic control, and railway signalling. A successful cyberattack could disrupt transport flow, cause delays in troop movements, and even lead to accidents or infrastructure damage. For instance, a coordinated cyberattack on Armenia's railway network could disrupt the movement of military supplies and personnel, potentially hindering the country's ability to respond to a crisis. Similarly, an attack on air traffic control systems could ground military aircraft, affecting air deployment and reconnaissance capabilities. The interconnected nature of modern transport systems makes them particularly vulnerable to such attacks, highlighting the need for robust cybersecurity measures to protect these critical assets.

Hybrid Warfare Tactics: Hybrid warfare involves the use of non-conventional methods by adversaries to achieve their objectives. These tactics often aim to exploit vulnerabilities and create instability without resorting to traditional military force. In the context of transport corridors, hybrid warfare can manifest in several ways. Sabotage operations, for example, might target key transport nodes such as bridges, tunnels, or railway lines, disrupting the flow of goods and military personnel.

Disinformation campaigns, spread through social media or other channels, can be used to create confusion and panic, hindering transport operations and undermining public trust in the government's ability to manage the situation. Adversaries may also employ proxy groups, such as local militias or criminal organizations, to carry out these disruptive activities, making it more difficult to attribute responsibility and retaliate. The goal of these hybrid tactics is to create chaos, disrupt essential services, and undermine the stability of transport corridors, thereby weakening the target nation's overall security and resilience. For example, during the conflict in eastern Ukraine, pro-Russian separatists used a combination of sabotage, disinformation, and the deployment of proxy forces to disrupt transport routes and supply lines (2), hindering the Ukrainian military's ability to defend its territory.

Natural Disasters and Environmental Factors: Natural disasters and environmental factors can pose significant threats to Armenia's transport infrastructure. The country's mountainous terrain makes it particularly vulnerable to events such as earthquakes, landslides, and heavy snowfall, which can damage or destroy roads, railways, and other transport facilities. For example, a major earthquake could trigger widespread landslides, blocking key transport routes and isolating entire regions. This would not only disrupt civilian transport but also hinder the movement of military forces and supplies, potentially affecting Armenia's ability to respond to a national security crisis.

Similarly, heavy snowfall in winter can render mountain passes impassable, cutting off ground routes and disrupting logistical operations. Climate change is also exacerbating these risks, with increasing temperatures leading to more frequent and intense natural disasters. Armenia's transport infrastructure must be designed and maintained to withstand these challenges, and the country needs to invest in disaster preparedness measures to mitigate their impact.

5. Strategies for Optimization and Enhancing Resilience

Infrastructure Development and Modernization: This section proposes strategies for improving Armenia's transport networks. It recommends specific projects for upgrading existing infrastructure, developing alternative routes, and integrating advanced technologies like intelligent transportation systems. For example, upgrading the M-2 highway, which connects Yerevan to southern Armenia, would improve the movement of goods and military personnel to the border regions. Constructing alternative routes, such as the North-South road corridor, would provide alternative connections to Georgia and reduce reliance on a single transit route. Implementing intelligent transport systems, such as traffic management centres and real-time monitoring, would improve transport efficiency and reduce congestion. These measures would enhance Armenia's ability to fast deploy forces, sustain military operations, and respond to internal and external threats.

Diversification of Transport Options: In addition to ground routes, Armenia can enhance its military transport capabilities by investing in military airlift capabilities and unmanned aerial vehicles (drones). Military airlift can provide a rapid and flexible means of transporting troops and equipment to distant locations, bypassing ground obstacles and potential disruptions. For instance, during a crisis situation, military transport aircraft could quickly deploy special forces units to a remote border region or evacuate civilians from a disaster zone. Drones can also play a crucial role in military transport, particularly for reconnaissance, surveillance, and delivering of small but essential supplies to hard-to-reach areas. This diversification of transport options would reduce Armenia's vulnerability to disruptions of ground routes and provide the military with more versatile and responsive transport capabilities.

Strengthening Regional Cooperation: Armenia's transport strategy could involve transport agreements with Georgia and Iran to secure access to Black Sea and Persian Gulf ports, respectively. However, these agreements carry risks. For example, if Georgia's political relations with Armenia's adversary, Azerbaijan, improve, Georgia might increase transit fees or impose restrictions on Armenian goods. Similarly, political instability in Iran or international sanctions could disrupt transport flows through Iranian territory. To mitigate these risks, Armenia should seek to diversify its transport partnerships and develop alternative routes, such as improving its own internal infrastructure to reduce reliance on external actors.

Enhanced Security and Protection Measures: To enhance the security and protection of its transport corridors, Armenia could implement several measures. For example, increased surveillance along key routes using technology such as CCTV and drones can help deter and detect potential threats. Regular patrolling by security forces can also ensure the safety of transport infrastructure and fast respond to any incidents. Investments in cybersecurity infrastructure are crucial to protect transport systems from cyberattacks, which could disrupt transport flow and cause significant damage. This includes measures such as firewalls, intrusion detection systems, and regular security audits. Finally, effective coordination between different agencies, including the military, law enforcement, and intelligence services, is essential to ensure a comprehensive and coordinated approach to transport security.

Logistics and Supply Chain Management: To optimize logistics and supply chain management, Armenia could implement several strategies. For example, modernizing warehousing

facilities with automated systems can improve inventory management and reduce the risk of loss or damage to military supplies. Implementing advanced tracking systems, such as RFID and GPS, can enhance supply chain visibility, allowing for real-time monitoring of the movement of goods and equipment. This can help to fast identify and address any disruptions or delays. Establishing strategic reserves of essential supplies, such as fuel, ammunition, and medical equipment, in secure locations can ensure their availability during emergencies. Adopting modern technologies, such as AI-powered forecasting tools, can improve demand planning and optimize transport routes, reducing transport costs and improving efficiency. These measures would help to ensure a smooth and efficient flow of supplies to Armenian forces, enhancing their operational readiness and effectiveness.

6. Conclusion – The Indispensable Link to National Security

Optimizing military transport corridors is crucial for Armenia's national security. In essence, maintaining and improving transport corridors isn't just a matter of logistical efficiency, but rather a fundamental requirement for Armenia to safeguard itself from external threats, maintain internal stability, and project power and influence in the region. The effectiveness of its military, the stability of its government, and its overall standing in the international community are all directly tied to how well Armenia manages its transport corridors.

Armenia's transport infrastructure faces challenges due to its mountainous terrain, landlocked status, and regional conflicts. To address these challenges, Armenia needs to:

- Modernize its infrastructure.
- Diversify transport options (including air transport and drones).
- Pursue cautious regional cooperation.
- Enhance security measures.
- Optimize logistics and supply chains.

Implementing these strategies will significantly improve Armenia's ability to respond to threats, maintain stability, and project power.

To ensure Armenia's national security, the Armenian government should prioritize the following **policy implementations**:

- **Increased Budgetary Allocations**: Dedicate a larger portion of the national defence budget to transport infrastructure projects. This could include:
  - Modernizing existing roads and railways: Allocating funds for the repair, upgrade, and expansion of key transport routes, such as the M-2 highway and the North-South corridor.
  - Developing alternative routes: Investing in the construction of new roads and railways that bypass vulnerable areas or provide alternative connections to neighbour countries.
  - Improving airport infrastructure: Upgrading existing airports and potentially constructing new ones to enhance military airlift capabilities.
- **Legislative Reforms**: Enact laws and regulations that facilitate transport infrastructure development and ensure its resilience. This could involve:
  - Streamlining land acquisition processes: Simplifying the procedures for acquiring land for the construction of new transport facilities.
  - Establishing transport security standards: Implementing regulations that mandate security measures for critical transport infrastructure, including protection against cyberattacks and physical threats.

- Promoting public-private partnerships: Creating a legal framework that encourages private sector investment in transport projects.

- **Inter-Agency Coordination**: Foster closer cooperation between various government agencies involved in transport and defence. This could include:
  - Establishing a joint task force: Creating a dedicated body comprising representatives from the Ministry of Defence, Ministry of transport, and other relevant agencies to coordinate transport planning and security.
  - Conducting joint training exercises: Organizing drills and simulations to test the ability of different agencies to respond to transport disruptions during emergencies.
  - Sharing information and intelligence: Implementing mechanisms for the timely exchange of information related to potential threats to transport corridors.
- **Technological Integration:** Adopt advanced technologies to enhance the efficiency, resilience, and security of transport networks. This could involve:
  - Implementing intelligent transport systems (ITS): Utilizing technologies such as real-time traffic monitoring, adaptive traffic signals, and electronic toll collection to improve transport flow and reduce congestion.
  - Investing in cybersecurity: Strengthening the protection of transport control systems against cyberattacks through measures such as firewalls, intrusion detection systems, and regular security audits.
  - Utilizing drones and satellite imagery: Employing these technologies for transport infrastructure surveillance, damage assessment, and disaster response.
- **Regional Diplomacy**: Engage in active diplomatic efforts to secure transport corridors and diversify external dependencies. This could include:
  - Negotiating transit agreements: conclusive agreements with Georgia and Iran to ensure stable access to seaports and transport routes.
  - Participating in regional transport initiatives: Collaborating with neighbouring countries on transport projects that enhance regular connectivity and reduce transport barriers.
  - Exploring alternative transport routes: Investigating the possibility of establishing transport connections with other countries in the region, such as through Turkey or Azerbaijan, if policies conditions allow.

In conclusion, Armenia's national security and its ability to project power and influence in the region are inextricably linked to the efficiency and resilience of its transport corridors. The strategic optimization of these corridors is not merely a logistical concern but a fundamental imperative for safeguarding Armenia's future.

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THE ROLE OF TECHNOLOGY IN ENHANCING PUBLIC SAFETY

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Abstract

This work examines the pivotal role of technological innovations in enhancing the effectiveness of public safety operations, with a focus on advanced technological solutions that improve resource management, preventive measures, and emergency response strategies. These technologies enable public safety agencies to adopt a more proactive approach to safety management, thus enhancing their ability to respond to evolving challenges. However, integrating these technologies presents several challenges, including budget constraints, cybersecurity threats, resistance to change within organizations, and the need for continuous skill development to keep up with rapid technological advancements. Addressing these challenges is critical to ensuring the successful adoption and implementation of new technologies.

To guide this process, the work advocates for adopting a Capabilities-Based Planning (CBP) approach, supported by the DOTMLPFI (Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, and Interoperability) framework. This strategic approach highlights the need for aligning organizational capabilities with public safety goals, ensuring that technological solutions are effectively integrated into the operational structure. By focusing on comprehensive assessments, resource optimization, continuous professional development, and stakeholder engagement, public safety organizations can optimize their technological investments. This methodology not only supports the smooth adoption of advanced technologies but also fosters greater interagency collaboration, ultimately strengthening community resilience and ensuring public safety in an increasingly complex and connected world.

***Key words**: public safety; technologies; strategies; capabilities; challenges; planning; management; preventive*

1. Introduction

In the face of rapidly evolving global threats, such as terrorism, organized crime, and natural disasters, public safety is increasingly confronted with complex challenges. Adding to this pressure are the growing expectations of citizens for better protection and risk prevention. To meet these new demands effectively, public safety institutions must not only rethink their strategies but also leverage cutting-edge technologies to optimize the use of human, material, and financial resources. Traditionally, resource management in public safety has relied on established, yet often rigid, methods where decisions were primarily driven by human experience and manual protocols.

Today, the rise of digital technologies such as artificial intelligence AI, big data, the Internet of Things (IoT), and intelligent surveillance systems is revolutionizing the field. These innovations enable more agile and efficient resource management. For instance, real-time surveillance systems, combined with predictive data analytics, now allow agencies to anticipate incidents and better allocate security forces. Additionally, the digitization of administrative and operational processes reduces costs, improves interagency coordination, and ensures faster responses to crises.

The introduction of technology goes beyond task automation; it profoundly transforms work practices. This includes training personnel, integrating drones for aerial surveillance, and optimizing infrastructure management through smart sensors. These advancements aim to improve service efficiency while maximizing the use of available resources. In this context, technology emerges not only as a tool for optimization but also as an innovation driver that is reshaping the public safety sector.

However, this transition brings its own challenges, particularly in terms of staff adaptation, resistance to change, and managing the investment costs of these new technologies. Therefore, it is important to understand how these tools can be coherently integrated and implemented to ensure a sustainable enhancement of resource management capabilities.

2. Current Challenges in Public Safety

Public Safety agencies around the world face increasing challenges due to a variety of factors, including rising crime rates, evolving threat landscapes, and resource limitations. As societies become more complex and interconnected, traditional methods of policing and emergency response are proving inadequate in addressing modern challenges. This chapter explores the core difficulties in public safety, such as growing crime rates, shifting threat dynamics, and the constraints on available resources.

2.1 Increasing Crime rate

Violent Crime Trends

Crime, including theft, assault, and domestic violence, is rising in many regions of the world. Law enforcement agencies are often overwhelmed by the number of incidents they must handle, making crime prevention increasingly challenging. According to the United Nations Office on Drugs and Crime (UNODC), the global homicide rate rose by 4% from 2015 to 2020, with specific regions, such as Latin America and Sub-Saharan Africa, seeing much higher rates of violent crime. In Latin America, countries like El Salvador and Honduras consistently record some of the highest murder rates, with over 50 homicides per 100,000 people in recent years **[1]**.

The Cybercrime Surge

Another growing threat in public safety is cybercrime. As societies become more dependent on digital infrastructure, criminal organizations and individual hackers have found new opportunities for illicit activities. According to a report by Cybersecurity Ventures **[2]**, cybercrime damages are projected to reach $10.5 trillion annually by 2025, up from $3 trillion in 2015. From ransomware attacks targeting hospitals and critical infrastructure to data breaches compromising sensitive personal information, the scope and severity of cybercrime have escalated dramatically. Law enforcement agencies are often ill-prepared to tackle these types of crimes due to the lack of specialized knowledge and technology. As a result, there is a pressing need for cybersecurity measures and enhanced training for public safety professionals.

2.2 Evolving Threat Landscapes

The Changing Nature of Terrorism

The global threat of terrorism has shifted from coordinated large-scale attacks to more isolated incidents, often carried out by individuals who have been radicalized. Moreover, terrorist groups are increasingly using social media and other online platforms to recruit members, spread propaganda, and plan attacks. The decentralized and digital nature of modern terrorism presents significant challenges to public safety agencies that are often unprepared to deal with these types of threats.

The Rise of Cyber Threats

In addition to terrorism, cyber threats have emerged as a top concern for public safety organizations. Critical infrastructure, such as power grids, water systems, and emergency services, is now more vulnerable than ever to cyberattacks. State-sponsored hackers, cybercriminals, and hacktivist groups have targeted these systems to cause widespread disruption, financial damage, and even loss of life. For example, the 2021 Colonial Pipeline ransomware attack in the U.S. disrupted

fuel supplies for several days **[3]**, showcasing the potential dangers of cyber threats to public safety. Public safety organizations must now not only focus on physical threats but also on securing their digital infrastructure.

Natural Disasters and Climate Change

Natural disasters, present another evolving threat. Hurricanes, wildfires, floods, and earthquakes are becoming more frequent and severe, posing significant challenges to public safety. These disasters require quick, well-coordinated responses, often involving multiple agencies working together. The increasing unpredictability of such disasters highlights the need for robust planning, technology-driven coordination systems, and resource management to effectively mitigate their impacts.

Complexity of Coordinating Responses

Dealing with evolving threats like terrorism, cyberattacks, and natural disasters requires a high level of coordination across various agencies, from local law enforcement and emergency responders to National Defense Forces. However, the complexity of modern crises often overwhelms traditional communication and coordination systems. For instance, in the aftermath of the September 11, 2001 terrorist attacks, one of the primary issues identified was the lack of communication between different agencies, which delayed critical decision-making **[4]**. Today, technology offers potential solutions and systems to these challenges. However, these systems are not universally adopted or fully optimized, leaving gaps in the overall effectiveness of response efforts.

2.3 Resource limitations

Budget Constraints

Public safety organizations often face significant budget constraints, which limit their ability to implement new technologies, hire personnel, or upgrade existing equipment. Funding is frequently allocated based on political priorities, which may not always align with the most urgent needs of law enforcement or emergency services. Furthermore, the increasing costs of advanced technology, such as AI-powered systems, surveillance networks, and cybersecurity measures, can be prohibitively expensive for smaller agencies or those in underfunded regions. These financial limitations prevent public safety agencies from fully modernizing their operations to meet contemporary challenges.

Outdated Equipment and Technology

Many public safety organizations are working with outdated equipment and technology, which further limits their effectiveness. In a world where criminals and terrorists are increasingly using sophisticated technologies, such as encrypted communications and drones, law enforcement agencies using outdated equipment may find themselves at a disadvantage. For example, outdated radio systems can create communication breakdowns during emergencies, while older surveillance technologies may not provide the real-time insights necessary for effective response. Upgrading equipment and technology is critical, but with limited budgets and competing priorities, this is often delayed.

Necessity for Efficient Resource Allocation

Given these constraints, public safety agencies must prioritize the efficient allocation of their limited resources. This requires the use of data analytics, predictive modeling, and decision-support systems to allocate personnel and equipment where they are most needed. For example, resource management software can track the availability of officers, vehicles, and equipment in real time, ensuring that resources are dispatched optimally. Predictive policing tools can also help agencies focus their efforts in areas where crime is most likely to occur **[5]**, thus maximizing the impact of

their limited resources. Efficient resource management is essential to ensuring that public safety agencies can meet their responsibilities even with limited funds, and equipment.

The challenges facing public safety agencies are complex and multifaceted, ranging from increasing crime rates and evolving threats to resource constraints. Addressing these issues requires not only innovative technological solutions but also efficient management practices and enhanced inter-agency collaboration. As crime and threat patterns continue to evolve, public safety organizations must adapt by investing in modern technologies, upgrading their infrastructure, and implementing effective resource allocation strategies.

3. Technological Solutions in Public Safety

As public safety challenges grow increasingly complex, the role of technology in addressing these issues has become indispensable. From enhancing decision-making capabilities to optimizing resource management, modern technological solutions offer public safety agencies the tools they need to operate more efficiently and effectively. Emerging technologies such as artificial intelligence, real-time data analytics, and smart surveillance systems, conduct to review public safety strategies to meet the requirements of today's dynamic environment.

This chapter illustrates these technological innovations, categorized into four key areas: decision-making, resource management, prevention solutions, and intervention, covering various facets of public safety from proactive to reactive measures.

Before focusing on specific technological solutions, it's important to assess the current environment through a SWOT analysis. This analysis highlights the benefits, challenges, and opportunities that come with integrating advanced technologies into public safety efforts.

3.1 SWOT Analysis

STRENGTHS	WEAKNESSES
Improved efficiency in resource allocation and response times.	High costs associated with implementing and maintaining new technologies.
Enhanced decision-making capabilities.	Resistance to change among personnel
Increased transparency and responsibility in law enforcement.	Interoperability Issues.
Crime prediction	Training Requirements
OPPORTUNITIES	**THREATS**
Emerging technologies.	Cybersecurity risks
Collaboration between agencies.	Technological Obsolescence
Improved public engagement.	Bias in Decision-Making Systems
Enhanced crisis and emergency management	Policy and Regulatory Challenges

Table 1 SWOT Analysis

Strengths

Improved Efficiency in Resource Allocation and Response Times

Technological advancements allow public safety agencies to optimize resource deployment, ensuring that personnel, equipment, and assets are directed to where they are most needed. Real-time data analytics, GPS tracking, and automated systems streamline processes, leading to faster and more efficient responses during emergencies.

Enhanced Decision-Making Capabilities

With the integration of artificial intelligence and big data, decision-making processes in public safety become more data-driven and accurate. Predictive analytics can forecast potential incidents based on patterns, helping agencies to act preventively and allocate resources accordingly. This shift reduces reliance on purely experience-based decisions and supports more strategic planning.

Increased Transparency and Accountability in Law Enforcement

Technologies such as body cameras, surveillance systems, and digital record-keeping enhance the transparency of law enforcement activities. This fosters greater accountability and builds public trust by providing clear, accessible records of interactions and decisions made by public safety officials.

Crime Prediction

Predictive policing tools analyse large datasets to identify trends and potential crime hotspots. By anticipating criminal activity, law enforcement can deploy resources more effectively, reducing crime rates and increasing community safety. This proactive approach shifts focus from reactive to preventive strategies in public safety.

Weaknesses

High Costs Associated with Implementing and Maintaining New Technologies

The adoption of advanced technologies requires significant financial investment, not only in acquiring the necessary systems but also in maintaining, upgrading, and securing them.

Resistance to Change among Personnel

Introducing new technologies often faces internal resistance. Personnel accustomed to traditional methods may be reluctant to embrace new tools, fearing job displacement or unfamiliarity. Without effective change management and training programs, this resistance can hinder the successful adoption of technology.

Interoperability Issues

One of the key challenges in adopting new technologies is ensuring that different systems often from various vendors can communicate and work together. Lack of interoperability can result in fragmented information systems that reduce the overall effectiveness of technology in public safety operations.

Training Requirements

Advanced technologies require a well-trained manpower capable of using these tools effectively. Continuous training programs are needed to keep personnel up-to-date with the latest developments.

Opportunities

Emerging Technologies

The rapid pace of innovation in fields like artificial intelligence, machine learning, drones, and the Internet of Things (IoT) offers public safety agencies the chance to adopt cutting-edge solutions. These technologies provide new capabilities, such as automated surveillance, real-time data analytics, and enhanced communication systems, which can significantly improve public safety outcomes.

Collaboration between Agencies

Technologies that facilitate real-time data sharing and communication between different public safety agencies, such as law enforcement, emergency services, and healthcare providers, enable more coordinated responses to crises. Enhanced collaboration can result in more efficient operations, improved resource sharing, and better outcomes during emergencies.

Improved Public Engagement

Digital platforms, such as social media and mobile applications, provide opportunities for public safety agencies to engage directly with communities. Through these platforms, agencies can share critical information, receive real-time reports from the public, and foster stronger relationships with citizens. This increased engagement can lead to greater trust and cooperation between the public and safety officials.

Enhanced Crisis and Emergency Management

Technologies such as advanced GIS (Geographic Information Systems), automated emergency notification systems, and disaster response simulations offer new tools for managing crises more effectively. These solutions allow agencies to prepare for, respond to, and recover from natural disasters, terrorist attacks, or other large-scale emergencies more efficiently.

Threats

Cybersecurity Risks

As public safety agencies adopt more digital technologies, they also become more vulnerable to cyberattacks. Unauthorized access to sensitive data, ransomware attacks, and system disruptions could severely undermine public safety operations. Ensuring robust cybersecurity measures are in place is essential to protect both infrastructure and citizen data.

Technological Obsolescence

The fast pace of technological advancement means that tools and systems can quickly become outdated. Public safety agencies may face the challenge of continuously investing in new technologies to stay current, which can be costly and resource-intensive. Failure to keep up with advancements could lead to inefficiencies and reduced effectiveness.

Bias in Decision-Making Systems

While AI and predictive analytics can significantly enhance decision-making, there is also the risk of biased algorithms. If these systems are not carefully designed and monitored, they may perpetuate existing biases, particularly in areas such as predictive policing, which could lead to unfair targeting of certain communities or groups.

Policy and Regulatory Challenges

The implementation of new technologies often outpaces the development of policies and regulations. Public safety agencies must navigate complex legal frameworks that govern data privacy, surveillance, and the use of AI in law enforcement. Inadequate or unclear regulations can delay the adoption of new technologies and expose agencies to legal risks.

In conclusion, while technological advancements offer significant opportunities for improving public safety through enhanced efficiency, decision-making, and prevention, they also present challenges such as interoperability issues, resistance to change, and policy barriers. Effective implementation requires careful planning, stakeholder engagement in order to bypass these weaknesses and attenuate risks. These technological solutions are presented as follow.

3.2 Decision Making Solutions

These technologies support informed decision-making through real-time data, predictive analytics, and AI-driven insights.

AI-Powered Video Analytics

AI video analytics exploits artificial intelligence (AI) technologies, including machine learning and deep learning, to analyse video streams intelligently. The key feature of AI video analytics is its ability to learn from data, adapt, and improve its performance over time. This dynamic approach enables AI video analytics systems to process vast amounts of video footage efficiently, extract valuable insights, and make data-driven decisions in real time. AI video analytics excels in object tracking and can simultaneously monitor multiple objects. It is capable of handling challenging scenarios such as occlusions, where objects temporarily obstruct each other while maintaining consistent tracking **[6]**.

Predictive Policing

Predictive policing employs historical crime data and machine learning algorithms to predict crime hotspots and identify patterns. By identifying areas at high risk for specific crimes, law enforcement can allocate resources proactively, potentially deterring crime before it occurs. Studies show that predictive policing has contributed to reduced crime rates in certain urban areas **[7]**.

Crime Mapping and Data Analysis (AI/ML)

Crime mapping tools use artificial intelligence AI and machine learning ML to analyze large datasets, identifying spatial and temporal patterns in crime data. By analyzing factors such as location, time, and crime type, these tools provide agencies with insights into trends and emerging risks. Crime mapping has been a critical asset in resource allocation and tactical planning for law enforcement agencies **[8]**.

Social Media Monitoring

Social media platforms are increasingly monitored by public safety agencies to detect potential threats, such as planned protests, violent incidents, or civil unrest. AI algorithms analyze social media data to identify keywords, sentiment, and location, providing early warnings of emerging risks. Social media monitoring played a crucial role in detecting threats during large events and ensuring timely responses by law enforcement **[9]**.

AI-Powered Dispatch Systems

The use of artificial intelligence (AI) in emergency response systems has transformed the way dispatch centers operate. AI-powered dispatch systems can analyse incoming emergency calls and prioritize them based on the severity of the situation, location, and available resources. This ensures that the most critical calls receive immediate attention. Additionally, AI can assist in resource allocation, helping dispatchers determine which units should respond to each incident. These systems use historical data and real-time information to make decisions quickly and efficiently. AI-powered dispatch systems are a testament to how technology has improved the decision-making process in emergency response, ultimately saving more lives **[10]**.

3.3 Optimization of Resources Management Solutions

These technologies focus on efficiently deploying resources like personnel, vehicles, and equipment for better coordination and utilization.

Automatic Vehicle Location

AVL systems play a transformative role in public safety by providing real-time tracking of vehicles, optimizing response times, and supporting resource management. Through GPS, AVL enables dispatch centers to monitor the precise location, speed, and status of vehicles, ensuring the closest available unit is dispatched to emergencies, which is crucial for life-saving responses. This continuous monitoring improves fleet efficiency by minimizing fuel costs, enhancing route planning, and enabling faster response times. AVL data can also be stored for historical analysis, supporting post-incident reviews and resource planning. When integrated with Computer-Aided Dispatch (CAD) and Geographic Information Systems (GIS), AVL enhances situational awareness and coordination across agencies.

Records Management System

RMS optimizes resources in public safety by streamlining data entry, centralizing information, and automating routine tasks, allowing personnel to focus on high-priority, field-based duties. Through efficient data management, RMS reduces administrative workload and supports data-driven decision-making, enabling better resource allocation based on patterns and trends in incident reports and crime data. RMS also improves interagency coordination by integrating with other systems like Computer-Aided Dispatch (CAD) and Automated Vehicle Location, enhancing communication and response effectiveness. By automating reporting and simplifying access to critical records, RMS reduces human error, conserves time, and fosters transparency, making it essential for efficient operations in public safety **[11].**

Wireless broadband Network (ex: FirstNet)

FirstNet is a nationwide, high-speed broadband network dedicated to first responders, created in response to communication challenges experienced during major disasters, where public networks often become congested or fail. By providing first responders with prioritized access to secure communication channels, FirstNet ensures reliable, uninterrupted connectivity during emergencies. This network supports real-time data sharing and advanced features, such as location tracking for personnel and vehicles, which is crucial for effective resource management and coordination across agencies. Moreover, FirstNet allows for cross-agency collaboration, which is essential in large-scale incidents where multiple services must work together seamlessly. With its resilient infrastructure, it is designed to remain operational under extreme conditions, enabling critical communication when it's needed most **[12].**

Traffic Management Systems (Smart Cities)

In smart cities, Traffic Management Systems (TMS) leverage Internet of Things (IoT) data, sensors, and real-time analytics to optimize urban traffic flows, particularly in aiding emergency response. These systems prioritize emergency vehicles by adjusting traffic signals dynamically, ensuring clear routes for ambulances, fire trucks, and police vehicles, which can reduce response times significantly. By monitoring and analysing traffic patterns, TMS can identify congestion or accidents instantly, allowing authorities to reroute vehicles and maintain smooth flow even during emergencies **[13]**. Additionally, TMS systems support communication with other public safety networks, enhancing overall situational awareness. This integration allows for more coordinated responses and optimisation of resources.

3.4 Prevention Solutions

These technologies are designed to prevent incidents, deter crime, and enhance security in both public and critical infrastructure.

Intelligent Surveillance Systems

Intelligent surveillance systems represent a significant advancement over traditional CCTV by incorporating artificial intelligence (AI) and biometric recognition technologies to monitor and analyze real-time video footage. These systems are designed not only to record but also to actively interpret scenes, using algorithms to detect suspicious or unusual behavior patterns, such as unauthorized entry, or erratic movements. Facial recognition technology can be integrated to identify known individuals or persons of interest, adding an extra layer of security and aiding in the swift identification of threats. This proactive detection capability enhances response times, as personnel can react before an incident fully unfolds **[14]**.

Environmental Monitoring Sensors

Environmental monitoring sensors equipped with Internet of Things (IoT) capabilities serve as crucial tools for early warning and prevention in natural disaster management. These sensors continuously monitor conditions in vulnerable areas, capturing data on factors such as air quality,

temperature, water levels, and seismic activity. By offering real-time data and immediate alerts, these systems empower communities and response teams to take preventive actions, reducing the potential impact of these events on public safety **[15]**.

Automatic Number Plate Recognition

ANPR is a technology that uses optical character recognition to capture and analyze vehicle license plates, aiding in law enforcement and traffic management. By automatically identifying vehicles in real-time, ANPR systems help authorities track stolen vehicles, monitor traffic violations, and even identify patterns related to criminal activities. In many cities, ANPR systems are integrated into traffic lights or patrol vehicles, allowing instant checks against police databases for warrants or violations, which speeds up response times and enhances public safety. Additionally, the data collected can support long-term traffic planning and congestion management **[16]**.

Gunshot detection

This technology uses acoustic sensors and AI to identify and locate gunfire in real-time, helping law enforcement respond more rapidly and precisely to incidents. These systems, often deployed in urban areas, analyze sound patterns to differentiate gunshots from other loud noises, triangulating the location of shots within seconds. By providing accurate coordinates, gunshot detection enhances situational awareness, allowing responders to prioritize high-risk areas and increase officer safety. The data gathered also supports investigations by documenting shooting incidents, even if unreported by the public **[17]**.

3.5 Intervention Solutions

These solutions enhance the ability of emergency services and law enforcement to act swiftly and effectively in response to incidents.

Body Cameras and Dash Cameras

Body cams and dash cams are technology solutions that increase an officer's safety and accountability. While there are controversies and issues surrounding these cameras and their implications of an individual's privacy, studies have shown that these technologies have significantly impacted the way the public views the work of law enforcement. There have been many cases where an officer was unjustly accused of being overly violent or inappropriate and the cameras absolved the officer of any wrongdoing. Using these advanced technologies does not only promote officer efficiency but can be a "second set of eyes" which can verify what the officer saw and how they responded. This has been shown to improve transparency to both the public and their superiors **[18]**.

Public Safety Radio Networks

Public Safety Radio Networks are crucial for supporting emergency services, including police, fire, and emergency medical teams. Unlike public cellular networks, these systems operate on dedicated radio frequencies, allowing first responders to communicate securely and reliably, even under challenging conditions such as natural disasters or high-demand public events where cellular networks may be overwhelmed. Public Safety Radio Networks often rely on digital trunked radio technology, which enhances communication with features like priority call routing, emergency signalling, and geolocation tracking of personnel, all of which contribute to more coordinated and safer response efforts. These networks, especially when integrated with platforms like FirstNet, ensure interoperability across agencies, allowing emergency responders from different sectors to work seamlessly together **[19]**.

Drones

Drones equipped with cameras are increasingly essential in emergency interventions, offering real-time situational awareness for public safety and crisis management. By providing aerial views of critical zones, drones support search and rescue missions, enable fire detection and management,

and allow law enforcement to assess dangerous situations remotely. This capacity to monitor hard-to-access or hazardous locations greatly reduces risks for first responders and facilitates faster, informed decision-making. For instance, in wildfire management, drones equipped with thermal imaging help identify heat sources and guide firefighting efforts efficiently, ensuring targeted interventions while keeping personnel out of harm's way. Drones enhances the speed and coordination of emergency responses, making them invaluable in modern public safety intervention **[20]**.

In conclusion, the various technologies discussed in this chapter underscore the transformative potential of innovation in enhancing public safety. From advanced surveillance systems that leverage AI for real-time monitoring to predictive policing techniques that analyze data for crime prevention, these solutions facilitate a proactive approach to safety management. Technologies such as AI-Powered Dispatch Systems and Wireless broadband Network improve emergency response coordination, while environmental sensors and drones provide critical situational awareness during crises.

The integration of these technological advancements not only optimizes resource allocation but also enhances decision-making processes for public safety agencies. However, this transformation is not without its challenges. Implementing these technologies requires addressing high costs, ensuring interoperability, and managing cybersecurity risks. Continued emphasis on strategic planning, personnel training, and interagency collaboration will be essential to realize the full potential of these innovations in strengthening public safety.

As we move into Chapter three, we will explore a structured approach to implementing these technological solutions through Capabilities-Based Planning (CBP). This chapter will examine how the DOTMLPFI framework, focusing on Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities, and Interoperability, can facilitate the effective integration of these technologies into public safety operations. By utilizing CBP, agencies can align their resources and strategies with the current challenges of public safety, ensuring that they not only adopt advanced technologies but also develop the necessary capabilities for their optimal use.

4. Approach to Implement Technological Solutions in Public Safety

In this present chapter, we will illustrate the structured approach proposed using Capabilities-Based Planning via six-step generic algorithm as model **[21]**. This model is adapted to incorporate processes from enterprise CBP due to the unique nature of public safety, which, in some areas, can be viewed as an enterprise with non-commercial outcomes. Additionally, public safety involves multiple stakeholders, including departments, agencies, and organizations that may fall under the jurisdiction of different ministries.

In the public safety context, CBP is an approach that ensures organizations possess the essential and fundamental capabilities required to address both current and future threats effectively. It emphasizes what organizations need to achieve their strategic objectives and maintain operational readiness. Originating in defense and military planning, CBP has recently gained traction across multiple sectors. But what exactly is a capability? In public safety, a capability encompasses the resources, technologies, procedures, and personnel skills that enable an organization to prevent, respond to, and manage emergencies and threats. Public safety capabilities should be designed to enhance readiness, improve operational efficiency, and ensure long-term sustainability. In other words, capability refers to what the organization does or can do to meet its strategic goals and ambition levels, focusing on the organization's core functions rather than specific methods or personnel, enabling effective responses to a wide array of incidents and threats.

4.1 Proposed Model

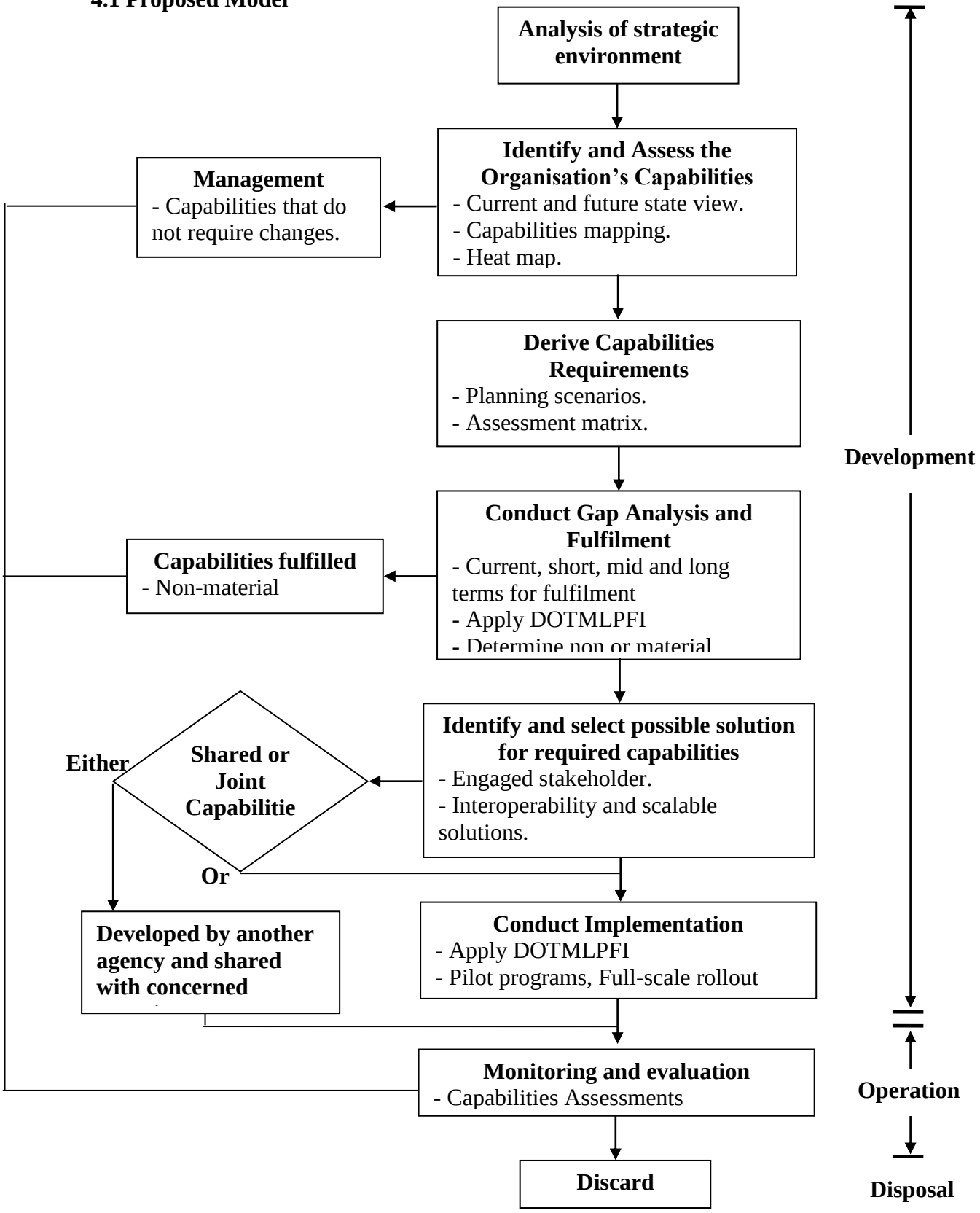

Fig.1 Proposed Chart for Implementing Technological solutions

Analysis of strategic environment

The first step in the proposed model involves identifying the range of potential mission types that a public safety organization may be expected to undertake in the future. It is also essential to understand the organization's strategic objectives and the level of ambition it aims to achieve.

Identify and assess the Organisation's Capabilities

The next step in this process involves defining the organization's capabilities by shifting from a functional view to a capability-based view. Using capability mapping, an initial "current state" view is created, with high-level and essential capabilities placed at the top. These top-level capabilities, known as "level zero" or "strategic capabilities," represent the organization's foundational strengths. Each level zero capability is then broken down into progressively detailed levels, ideally up to level 3 or 4, which are termed "core or operational capabilities" as they define the organization's primary missions and activities. Additionally, there are "supporting capabilities" that are necessary for organizational functions such as human resources management and financial management.

These capabilities are distinct and cannot be easily replicated, as the focus remains on what the organization does rather than how it operates. Capability mapping is designed to remain stable and resistant to change; even organizational restructuring does not affect the capability map. Only a significant shift in the organization's strategic direction would influence the structure of the map **[22]**.

Using a heat map, the organization can assess current capabilities, identify those that require enhancement, and determine any new capabilities that may be necessary to support its objectives. Finally, capabilities are prioritized as high, medium, or low. This process helps create a future-state view that aligns with the organization's strategic goals **[23]**.

Existing capabilities that do not require changes should be maintained, actively utilized, and regularly assessed through effective management **[24]**.

Derive Capabilities requirements

To derive capability requirements and determine minimum levels of force, manning, and operational readiness, it's essential to begin with a set of realistic planning scenarios that encompass the types of events a public safety organization might face, such as natural disasters, terrorist threats, and health crises. Each scenario requires the identification of critical capabilities, including specific operational readiness levels, minimum staffing, and any specialized equipment. Using a capability assessment matrix, the organization can then evaluate its current capabilities for each scenario, categorizing each as high, medium, or low in areas like force manning, operational readiness, and logistical support. This structured approach enables a thorough gap analysis, pinpointing areas where current capabilities may fall short and highlighting where enhancements or new resources are required.

With the matrix and analysis in place, public safety organizations can prioritize key capabilities that need attention. This prioritization facilitates a clear plan to address gaps by implementing targeted upgrades or new capabilities aligned with the organization's strategic goals. Through this ongoing assessment and prioritization, agencies can maintain a future-state view, regularly adjusting their resource and operational requirements to align with evolving threat landscapes and organizational objectives **[24] [25]**.

Capability Area	Scenario 1: Disaster Response	Scenario 2: Terrorist Attack	Scenario 3: Health Crisis
Fore Manning	Medium	Low	High
Operational Readiness	High	Medium	Low
Specialized Equipment	Low	High	Medium

Table 2 Example of Capability Assessment Matrix

Conduct Gap analysis and fulfilment

This process helps identify capability requirements that can be fulfilled in the short term, those planned for fulfilment in the mid to long term, those currently unfulfilled, and those that exceed current needs. The DOTMLPFI framework can be used to determine whether material or non-material approaches are recommended to address any capability gaps.

To illustrate, suppose the commander of a public safety organization sets a strategic goal of reducing the monthly accident rate by 20% over the next four years. To achieve this, we employ capabilities-based planning (CBP) as a framework to develop a comprehensive roadmap. First, we use capability mapping to build a "current state" view that highlights core operational capabilities while categorizing supporting functions under corporate capabilities. Through a heat map assessment, we identify existing capabilities that require enhancement and derive new capabilities necessary for the "future state" view aligned with our target. Figure 2 visually represents this process.

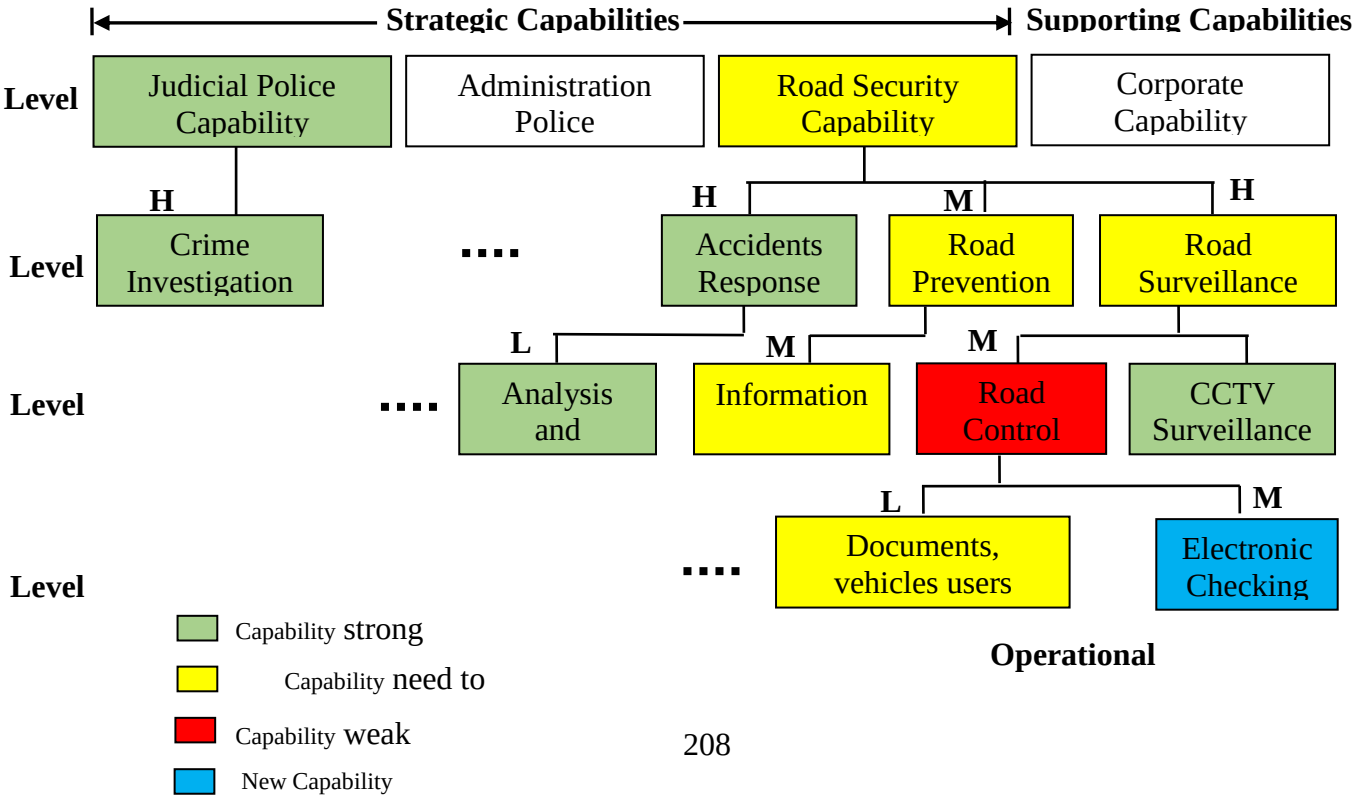

Fig.2 Example of future state of Public Safety Organization's Capabilities

Step 2: Conduct Detailed Analysis and Identify Gaps
1- Accident Data Analysis:

- Gather and classify the accident data from the past six months according to the causes provided:
  - **40%** due to high speed;
  - **25%** involving land transportation vehicles (trucks and buses);
  - **20%** with drivers who have held a license for only one year;
  - **10%** attributed to poor road conditions;
  - **5%** related to law violations.

2- Accident Plotting Using GIS Geographic Information System:

- Use GIS software to plot the accident locations on a map, placing each incident by its exact geographic coordinates.

- Using the GIS visualization, identify **high-risk segments** of the road where multiple accidents are recorded. Prioritize these segments based on accident causes:
  - Highlight areas with clusters of high-speed-related accidents;
  - Look for positions accidents where poor road conditions are reported.

3- Gap Analysis and Solution Recommendations Using DOTMLPFI

- Determine both short-term and medium-term needs and identify material and non-material solutions for addressing capability gaps.

Causes	Non-Material Solutions		Material Solutions	
	Short-term	**Impact**	**Medium-term**	**Impact**
High speed	Increase check-point in the high risk segment	hinder Traffic flow	Install speed monitoring radars.	Develop new capability, including training and update of Law.
Land transport	Launch awareness campaigns	Enhance organisation's Information Capability	Install tachographs on trucks for speed and behavior tracking	-Develop new joint or shared capability involving stakeholders, update protocols, and train staff for data interpretation; -Ensure technical

				solutions are interoperable across stakeholder platforms; - Update Law.
New licences	1-Awareness campaign 2- Improve driving school curriculum.	1-Inernal action 2-Engagement stakeholder.	/	/
Road conditions	Inform relevant external agencies for immediate repairs	Increased inter-agency collaboration	External short term action should be conduct by the appropriate agency.	Engagement stakeholder.
law violations	Awareness campaigns for traffic law adherence	Enhances public compliance and organizational information capability	/	/

Table 3 Solution Recommendations

By identifying these solutions, the organization can first implement short-term measures and evaluate their effectiveness in meeting the accident reduction target. If these initial efforts fall short of the objective, the organization can then develop a strategic roadmap to address accident rates more comprehensively. This roadmap would outline mid-term solutions, including the implementation of new capabilities, ensuring a sustained and effective reduction in accident rates over the coming years.

How can this be achieved? The answer lies in the next step of the proposed model.

Identify and select possible solution for required capabilities

This step in the process focuses on identifying potential technical solutions to develop the new capabilities identified through gap analysis. Initially, it is crucial to determine whether these new capabilities are joint or shared across various public safety agencies to prevent duplication of resources and solutions. Given the nature of public safety organizations and their missions, where joint operations are frequently required, especially in emergency and crisis situations, engaging relevant stakeholders is essential to assess their needs for interoperability with existing systems. This collaborative approach facilitates inter-agency data sharing and the integration of technological platforms, enhancing the effectiveness of response efforts.

Moreover, it's important to ensure that the chosen solution aligns with operational requirements and can adapt to evolving demands. Therefore, the solution should be scalable, allowing for expansion and modification as future needs arise, without requiring a complete redesign. This adaptability will support the organization in maintaining effective capabilities as mission demands grow or change. A comprehensive risk assessment is also necessary to evaluate potential risks associated with the absence of each proposed technology, including security vulnerabilities and inefficiencies that may impact operational readiness.

Furthermore, given the high cost of these technological solutions, prioritizing the most critical capabilities is essential. Consideration should be given to life-cycle costs, as each capability progresses through stages of development, procurement, operation, maintenance, and, eventually, disposal **[24]**. Prioritizing high-impact capabilities while managing their full life-cycle costs ensures strategic, long-term resource allocation.

Conduct Implementation

This final step in the process of capability development involves creating a comprehensive roadmap to implement the identified technological solutions, ensuring they are ready, sustainable, and resilient. The roadmap should outline a phased approach, detailing timelines, resources, and responsibilities for each stage of the implementation.

To minimize risks and enhance effectiveness, the implementation process should begin with pilot programs that test new technologies in real-world settings. These pilots allow for valuable insights and adjustments before a full-scale rollout, ensuring that the solutions are well-suited to the operational demands and environment. Pilot testing also provides an opportunity to gather feedback from end-users, making it possible to refine the solution for optimal functionality and user experience. This careful approach ensures a smoother transition to full implementation and increases the likelihood of long-term success for the organization's capability enhancement efforts.

Applying the **DOTMLPFI framework [26]** can indeed streamline the implementation of technological solutions by ensuring that every aspect of organizational readiness is addressed. The framework covers each essential area that supports the introduction and sustainability of new technology capabilities:

1. **Doctrine**: Review and update policies, Standard Operating Procedures (SOPs), and operational guidelines to effectively integrate new technologies. This includes aligning these updates with organizational objectives and ensuring that the operational framework accommodates emerging technologies. Additionally, it is important to review and amend existing laws and regulations, particularly those related to new technologies such as surveillance cameras, data privacy, and the use of social media, to ensure legal compliance and ethical use.
2. **Organization**: Define or adjust organizational structures to support the technology, ensuring that teams, roles, and responsibilities are clear and aligned with the new capabilities.
3. **Training**: Develop and deliver tailored training programs for personnel to ensure they acquire the necessary skills to operate and maintain the technology efficiently. This will minimize user errors, improve proficiency, and optimize the technology's effectiveness.
4. **Materiel**: Procure, manage, and maintain the physical and digital assets required for the technology implementation. Adopting a lifecycle management strategy for technological assets ensures they remain current, effective, and capable of meeting the evolving needs of public safety.
5. **Leadership**: Establish leadership roles and responsibilities to champion the implementation, guiding teams through the transition and fostering a culture that supports technology adoption and continuous improvement.
6. **Personnel**: Evaluate and adjust staffing needs, ensuring that personnel with the appropriate skills and expertise are available to operate, troubleshoot, and improve the technology over time.

7. **Facilities**: Assess and adapt physical infrastructure, ensuring that facilities can support the new technology (e.g., power, security, network capacity) and provide a conducive environment for its operation.
8. **Interoperability**: Ensure that the technology complies with common standards and can integrate seamlessly with other systems (without compromising functionality) within and across agencies, thereby supporting cross-functional collaboration and data sharing in joint operations. An excellent example is APCO P25, or **Project 25**, a suite of standards developed by APCO (Association of Public-Safety Communications Officials) for digital radio communications in public safety. The P25 standard ensures interoperability, allowing public safety agencies (like police, fire, and EMS) to communicate seamlessly across different radio systems and equipment, even if they come from different manufacturers. This standard is widely adopted in North America and is instrumental in enabling effective, cross-agency coordination during joint operations, critical incidents and emergency responses **[27]**.

By methodically applying each element of the DOTMLPFI framework, organizations can ensure the successful, sustainable integration of technological solutions that are fully aligned with strategic goals and capable of adapting to future needs.

Once the necessary technological solutions and capabilities are implemented, the next crucial step is to systematically monitor and evaluate their performance during the entire operation process.

Monitoring and evaluation

Identifying the performance level of the implemented capabilities and comparing it to the expected level required to meet the desired outcomes. To ensure that the organization's strategic goals are being met, it is essential to establish key performance indicators (KPIs) and metrics that will allow for the systematic evaluation of performance. These metrics could include response times, accident reduction rates, efficiency in resource allocation, and the effectiveness of inter-agency collaboration.

By regularly monitoring these performance metrics, the organization can assess whether the implemented capabilities are achieving the intended results. If the performance levels fall short of expectations, corrective actions can be taken, such as optimizing operational processes, upgrading technology, or enhancing training programs. This step ensures that the organization is continuously improving and adapting to meet its evolving goals and mission requirements.

The final step of the process is the disposal of capabilities that are no longer needed or have reached the end of their life cycle. If a capability is deemed obsolete, inefficient, or redundant, it should be retired or replaced with more effective solutions.

As conclusion, the proposed model utilizes capability mapping and heat mapping to assess the organization's current capabilities, identify gaps, and prioritize improvements based on strategic goals. Capability mapping defines the core operational and supporting capabilities, while the heat map visually categorizes these capabilities as high, medium, or low priority, helping to highlight areas requiring attention. To address these gaps, the model employs the **DOTMLPFI** framework, which ensures a comprehensive approach by considering key areas such as Doctrine, Organization, Training, Materiel, Leadership, Personnel, Facilities, and Interoperability. Together, these tools guide the organization in aligning its capabilities with its strategic objectives, optimizing resource allocation, and ensuring the effective implementation of technology solutions.

4.2 Prioritized Action Plan

Drawing from my experience within a Public Safety Organization and the insights gained through the deployment of technological solutions, the following **Action Plan** is suggested to streamline the implementation process. This plan categorizes key steps in **short-, mid-, and long-term phases** to ensure an organized and effective approach.

Short-Term Actions

- **Prioritize the establishment of a legal framework** for exploiting technological solutions, particularly those concerning privacy standards and human rights considerations. This foundational step is critical and should be initiated early, as it often involves complex processes requiring the involvement of parliament and other regulatory structures. Establishing a strong legal foundation from the outset ensures that technological adoption aligns with ethical standards and public trust. A real-life example includes the deployment of a body camera solution, which faced delays due to the legal framework not being fully prepared.
- **Initiate the development of infrastructure** required to support technological solutions as early as possible, as such projects often take significant time to complete. Delays in infrastructure readiness can hinder the installation of technical equipment, leaving organizations with stored equipment while warranty periods begin to lapse. This situation can result in lost time, increased costs, and reduced operational efficiency. Prioritizing infrastructure development ensures that equipment can be deployed promptly and effectively upon acquisition.
- **Conduct pilot programs** to test new technological solutions in real-world scenarios. These pilots help identify potential challenges, refine systems, and assess effectiveness before full deployment. Involve key stakeholders, set clear objectives, and evaluate performance to ensure the technology meets operational needs and is ready for broader implementation.

Mid-Term Actions

- **Training-Develop and deliver** targeted training programs for personnel to build the skills necessary to operate and maintain the technology proficiently, minimizing user error and maximizing effectiveness. To address the specific needs of different groups, training is divided into two types:

  - **Operational Training:** Designed for end-users, focusing on the practical application of technological solutions in daily public safety operations.

  - **Technical Training:** Targeted at technical staff responsible for installing, integrating, and maintaining the technical solutions. This training encompasses systems architectures, troubleshooting, configurations, and ensuring the long-term operability and scalability of the technologies.
- Following successful pilots and training, a **Full-scale Implementation** can be initiated to deploy technological solutions across all relevant departments and units. This phase involves rolling out the technology to all intended users, ensuring systems are fully integrated into existing workflows and operational structures. A comprehensive support

system should be in place to assist users during the transition. Continuous monitoring, data collection, and user feedback are essential to identify potential challenges and optimize the system for maximum efficiency. This will help ensure the technology's effectiveness, troubleshoot issues quickly, and guarantee long-term sustainability within the organization.

- **Cybersecurity Layer**- As public safety agencies increasingly rely on digital technologies, cybersecurity becomes a critical concern. A robust cybersecurity layer must be integrated into all technological solutions to protect sensitive data and ensure the integrity of communication systems. Implementing security measures such as encryption, secure access controls, regular system audits, and incident response plans will help safeguard against cyber threats **[28]**.
- **Inter-agency coordination** is essential for the successful implementation of technological solutions in public safety. It ensures effective communication, collaboration, and resource sharing among agencies, preventing duplication and optimizing efforts. Regular meetings, joint training, and shared platforms can improve cooperation and alignment across agencies. This unified approach enhances public safety outcomes by addressing challenges collectively and efficiently.
- **Retention of Knowledge and Skills**
  People working on critical technologies are invaluable assets to public safety organizations, given their expertise and experience. It is essential, therefore, that organizations develop strategies to retain these skilled individuals even beyond traditional retirement age, allowing them to share their knowledge and mentor newer recruits **[29]**.

Long-Term Actions

- **Enhancing Transparency, Accountability, and Integrity**
  Institutionalizing policies that integrate technological solutions is fundamental to enhancing transparency within public safety operations. These policies ensure that actions, decisions, and processes are clear and verifiable, allowing the public to understand how public safety agencies perform their duties. For example, the deployment of body cameras provides an objective record of interactions, reducing the potential for misuse or abuse of power and fostering trust between law enforcement and the community. By embedding such technologies into the organizational framework, public safety agencies align their operations with the principles of integrity, ensuring decisions are made ethically and consistently. Over time, these institutionalized practices foster a culture of accountability, reinforcing public trust and supporting public safety efforts in alignment with good governance **[30]**.

- **Building Public Trust**
  Transparency, accountability, and integrity serve as the foundation for building trust with the public and improving engagement. By Institutionalizing Policies**,** public safety organizations not only enhance their operational transparency but also demonstrate their commitment to ethical practices. This commitment builds **Public Trust**, as citizens gain confidence that safety measures are being applied equitably and responsibly.
- **Improving Public Engagement**
  Once trust is established, agencies can further strengthen relationships with the community through **Improving Public Engagement**. Transparent practices and visible

accountability encourage more open communication, creating opportunities for collaboration and mutual understanding. Technological tools like body cameras, real-time data sharing, and social media platforms foster a two-way dialogue that involves citizens in shaping public safety strategies, cultivating shared responsibility and ownership of community safety.

This progression, from institutionalizing transparency to promoting trust and encouraging engagement, creates a cohesive framework for leveraging technology to achieve integrity and effectiveness in public safety operations. This not only enhances community confidence but also strengthens the societal cohesion through shared responsibility and collaborative governance.

Conclusion

The integration of advanced technological solutions within public safety organizations is essential for enhancing operational efficiency, responsiveness, and overall mission success. Throughout this work, we have explored a structured approach to technology implementation based on Capabilities-Based Planning (CBP) and **DOTMLPFI** framework, emphasizing the importance of aligning technology with strategic goals, addressing potential challenges, and ensuring long-term sustainability.

The key recommendations presented, ranging from mitigating resistance to change through effective change management strategies, to ensuring the retention of knowledge and skills through continuous professional development, highlight the critical factors that influence successful technology adoption. Furthermore, a focus on cybersecurity, technology watch, and adaptability ensures that public safety agencies can remain resilient in the face of emerging threats and evolving technological landscapes.

By adopting a holistic, capability-focused approach and integrating these best practices, public safety organizations can enhance their ability to prevent, respond to, and recover from various emergencies and threats. Ultimately, the careful and deliberate implementation of technological solutions will not only improve the operational readiness of public safety agencies but also foster greater collaboration, interoperability, and resilience across sectors, ensuring that communities are better protected in an increasingly complex world.

In conclusion, the effective implementation of technology in public safety is not merely a matter of acquiring new tools but involves a comprehensive, forward-thinking strategy that addresses the technical, organizational, and human aspects of change. By continuously assessing capabilities, fostering innovation, and ensuring the engagement of all stakeholders, public safety organizations can create a robust framework that meets both present and future challenges with confidence and efficiency, while promoting transparency and building public trust.

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CHALLENGES AND PERSPECTIVES IN MILITARY EDUCATION: DEVELOPING STRATEGIC LEADERS AND STRENGTHENING NATIONAL RESILIENCE

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Abstract:
This paper examines the evolving role of military education as a driver of organizational culture, strategic leadership development, and national resilience. Drawing on NATO, EU, and Romanian defense policy documents, as well as academic literature on professional military education (PME), the study argues that modern military education must balance tradition with innovation while integrating digital capabilities, interdisciplinary curricula, and civil–military cooperation frameworks. The paper proposes policy recommendations and identifies structural challenges such as curricular rigidity, limited interinstitutional integration, and resistance to organizational change. Overall, it highlights the critical role of military education as a strategic enabler within contemporary security ecosystems.

Key words: military education, organizational culture, strategic leadership, national resilience, NATO, EU security, Romania

1. Introduction

In an increasingly unstable geopolitical context, characterized by hybrid conflicts, cyber threats, and recurring crises, military education should hold major strategic importance. While in the past the emphasis fell predominantly on the tactical and technical training of military personnel, the current paradigm has shifted significantly. Military education is now viewed as an essential vector in strengthening the organizational culture of defense structures, in developing strategic leadership, and in supporting national resilience. Thus, it is no longer merely a professional tool but an integrated component of national security, aligned with the requirements of international partnerships such as NATO and the EU [1] [2].

Military education has undergone profound transformation as modern security environments become increasingly complex, interconnected, and technology-driven. Contemporary military education systems must simultaneously preserve the traditions and ethos of the profession of arms while adapting to hybrid threats, cyber warfare, and geopolitical volatility [3].

In this context, Romania's military education institutions—such as the "Nicolae Bălcescu" Land Forces Academy—play a dual role: safeguarding identity and building operational and strategic capability [4].

This article analyzes how military education contributes to strengthening organizational culture, forming strategic leaders, and developing national resilience in Romania, in the context of current security challenges. It also aims to identify weaknesses and challenges faced by the military

education system and propose solutions for adaptation and reform. The premise is that a modernized military education system—adapted to new operational realities and integrated into a coherent interinstitutional framework—can transform this field into a pillar of national security and resilience.

To prepare this article, we conducted qualitative research that included analysis of strategic documents (doctrines, national and international policies), relevant academic studies, and examples of best practices from Romania and the Euro-Atlantic space. Secondary sources such as NATO and EU reports and fundamental works in the field of military leadership and organizational sociology were also considered [5], [6]. The article follows an analytical structure in which each dimension—organizational culture, strategic leadership, and national resilience—is treated separately but in correlation, ending with conclusions and recommendations.

Through this approach, the article aims not only to offer a radiography of the current military education system but also to highlight its emerging role in the broader architecture of Romania's state security.

2. Military Education and Organizational Culture: Between Tradition and Modernity

Military organizational culture is defined as a coherent system of values, symbols, and norms that influence the behavior and decisions of members of the institution. Military education is the main channel through which these values—such as honour, discipline, loyalty, or duty—are transmitted and strengthened from one generation to the next.

Organizational culture in the military shapes behavior, decision-making, cohesion, and professional identity. Through formal education, values such as honor, duty, discipline, and loyalty are transmitted across generations. Academic studies emphasize the decisive influence of PME (Professional Military Education) on shaping culture, especially as institutions adapt to new forms of warfare and technology [7].

In Romania, military academies play a central role in this process, as they shape military professional identity through institutional traditions and specific curricular content. At the same time, the educational process is challenged by generational changes, digitalization, and the diversification of threats [8]. The adaptability of organizational culture depends directly on the flexibility of the educational system.

2.1 Strategic Leadership and Its Formation through Military Education

Strategic leadership involves the ability to formulate visions, coordinate security policies, and operate in complex, multinational, and politically influenced environments. The development of strategic leaders requires a gradual progression from the tactical to the strategic level, supported by specialized institutions such as the National Defense College or the NATO Defense College.

Strategic leadership is increasingly essential as officers must operate in multinational, complex, ambiguous environments. NATO's educational doctrine stresses that PME must cultivate critical thinking, strategic foresight, and adaptive leadership [9].

Romania integrates these principles gradually through national and international programs, contributing to a cadre of leaders capable of linking national defense planning with broader interagency and alliance requirements.

Officers who complete these levels are exposed to advanced geopolitical perspectives, risk analysis, decision-making under uncertainty, and crisis management. In this sense, strategic military

education must go beyond traditional training and include concepts such as strategic foresight, institutional communication, and adaptive leadership [10].

2.2 Challenges and Vulnerabilities in the Military Education System

Despite progress, the military education system displays notable vulnerabilities. A first weakness is curricular rigidity, which leaves little room for developing critical thinking and adapting to new operational realities. Often, the emphasis remains on theoretical accumulation at the expense of practical applicability.

Another problematic aspect is the lack of constant updates to educational content in relation to the dynamics of contemporary threats: cyber warfare, disinformation, energy security, or attacks on critical infrastructure [1], [2].

Institutional resistance to reform—generated by a traditionalist organizational culture—is another major obstacle. Although value stability is a strength, it can become a barrier to educational modernization in the absence of a balance between tradition and innovation.

These findings are consistent with comparative studies on PME reform in NATO states) [11].

Likewise, the lack of real cooperation between defense institutions, the education sector, public administration, and the private sector reduces the capacity to build an educational ecosystem adapted to the interinstitutional reality of modern security. This affects not only the quality of strategic leadership but also the ability to develop genuine national resilience.

3. Military Education and National Resilience

National resilience is a strategic concept that reflects a society's ability to withstand, respond to, and recover from a major crisis. Military education contributes significantly to this objective by preparing leaders capable of addressing complex situations and by fostering a culture of proactive and integrated response.

National resilience requires cooperation across government, private sector, and civil society. EU strategies highlight the need for coordinated civil preparedness and cross-sector crisis planning (European Commission, 2020) [1].

Romania, as a NATO and EU member state, has begun to include modules on cyber defense, critical infrastructure protection, and civil-military cooperation in its military education system. In this regard, military personnel become essential actors in promoting social resilience through their professionalism and ability to intervene efficiently in crises—military or civilian.

Resilience is not merely a strategic objective but an indicator of institutional maturity, and military education plays a key role in developing this adaptive capacity both operationally and socially.

Conclusions

Contemporary military education must be regarded as a strategic tool for strengthening national defense and resilience. It contributes to forming a stable organizational culture, developing strategic leadership, and enhancing the state's ability to manage crises effectively.

Military education should be treated as a strategic enabler for national defense and resilience.

Therefore:

- PME must adopt modular, flexible curricula updated annually according to threat assessments.
- Digital tools—simulators, cyber ranges, wargaming—should be fully integrated into assessment.

- Partnerships with NATO Defense College and similar institutions must be formalized.
- Faculty development and pedagogical innovation should be incentivized.
- Interinstitutional exercises and civil–military modules must become mandatory.

At the same time, the military education system must actively address its own challenges: curricular rigidity, lack of content updates, generational gaps, and weak interinstitutional cooperation. A relevant and modern military education system is not only an institutional necessity but a vital component of national security.

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CAPABILITIES-BASED PLANNING IN MILITARY LOGISTICS: COLOMBIAN MILITARY FORCES CASE

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Abstract: *In the contemporary global security landscape, armed forces must navigate increasingly complex and dynamic challenges. Capabilities-Based Planning (CBP) has emerged as a strategic approach to defense planning, emphasizing the development of versatile capabilities to meet a wide range of operational scenarios rather than focusing solely on specific threats. This paper explores the implementation of CBP in different national contexts, with a focus on NATO and Colombia, highlighting the benefits and challenges of this approach.*

NATO has been a pioneer in adopting CBP, promoting interoperability and resource optimization among its member states. This approach allows NATO to maintain readiness and cohesion across diverse scenarios, enhancing its collective defense capabilities. In contrast, Colombia's experience with CBP underscores the adaptability of the model in resource-constrained environments. Despite logistical and infrastructural challenges, Colombia has successfully implemented CBP as part of its transformation and future of the Public Force program, prioritizing critical capabilities and optimizing resource use to address emerging threats.

Key words: *Capabilities, Planning, Defense, Transformation , Strategy , Logistics , Interoperability, Sovereignty, Evaluation , Security.*

Introduction

In today's complex global security environment, armed forces face increasingly diverse and dynamic challenges. The need to rapidly adapt to new threats and operational scenarios has led many nations to adopt capabilities-based planning (CBP) as a strategic approach to defense planning. This model focuses on identifying and developing the necessary capabilities to meet strategic objectives, rather than simply responding to specific threats.

The North Atlantic Treaty Organization (NATO) has been a pioneer in implementing CBP, promoting a standardized approach among its member states. This approach allows NATO to coordinate and optimize its collective resources, ensuring that allied forces can operate jointly and effectively across a variety of scenarios. According to the document "Analytic Architecture for Capabilities-Based Planning, Mission-System Analysis, and Transformation", the use of appropriate analytical tools allows for the adaptation of analytical material for different audiences and occasions, which is crucial in collective defense organizations like NATO, where time constraints can significantly impact decision-making processes (Davis, 2002).

However, the application of CBP is not limited to NATO countries. Global partners, who often possess varied and difficult to standardize military capabilities, are also adopting this model to improve their interoperability and operational effectiveness. As noted in the document "Military Capabilities and Strategic Planning Conundrum" although there are differences in approaches to the

concept of capability among countries, the outcome of each planning process has not hindered operations in various theaters (Correia, 2019).
The comparison between NATO countries and their global partners reveals significant differences in the implementation of CBP. While NATO members benefit from a common framework and shared experience, global partners face the challenge of adapting the model to their unique national contexts. Nevertheless, with proper application of CBP, future standardization is possible, enabling closer and more effective cooperation in joint operations.
This document explores how CBP can be adapted and applied in different national contexts, highlighting lessons learned from NATO and their implications for global partners. Through a detailed analysis of cases and examples, it aims to provide a deep understanding of how CBP can transform defense planning and enhance responsiveness to emerging threats.

Theoretical Framework

Definition of Capabilities-Based Planning

Capabilities-based planning (CBP) is a strategic approach that focuses on developing the necessary capabilities to address a wide range of challenges and operational scenarios, rather than preparing for specific threats. "…(CBP) *is planning, under uncertainty, to provide capabilities suitable for a wide range of modern-day challenges and circumstances while working within an economic framework."*(Davis, 2002). This strategy enables military organizations to flexibly respond to evolving strategic landscapes while maintaining their forces' readiness across diverse operational scenarios. Additionally, it promotes the development of versatile capabilities that can address both conventional and emerging threats. Furthermore, this adaptive framework allows defense planners to efficiently allocate resources and implement training programs that prepare forces for multiple contingencies simultaneously.

Fundamental Principles of CBP

CBP is based on several key principles that distinguish it from other planning approaches, such as threat-based planning. One fundamental principle is the identification and development of capabilities through Lines of Development (LoD), which include doctrine, organization, training, material, leadership, personnel, facilities, interoperability, and policy (DOTMLPFI+P) (Correia, 2019). These LoDs are essential to ensure that armed forces can operate jointly and effectively, both nationally and internationally.
Capabilities-Based Planning emphasizes the development of flexible, adaptive, and robust military capabilities that can effectively respond to a wide range of potential threats and operational scenarios. This approach prioritizes planning under uncertainty, allowing for the identification of essential capabilities that can be tailored and assembled as needed, rather than relying on specific threat scenarios. By focusing on modular building blocks and the ability to rapidly adapt to changing circumstances, CPB aims to ensure that military forces are prepared for diverse challenges while optimizing resource allocation within an economic framework. (Davis, 2002).

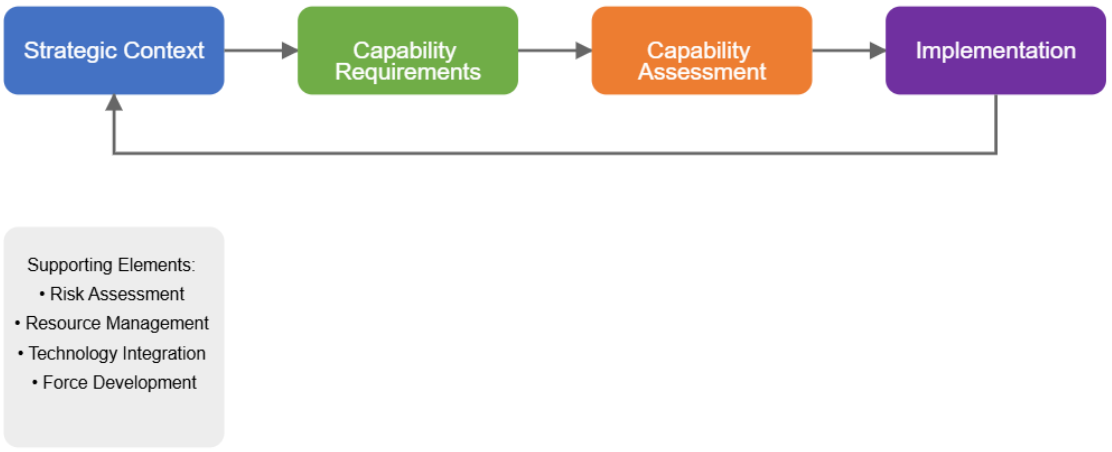

Fig 1. Capabilities-Based Planning Process Flow

Comparison with Threat-Based Planning

While threat-based planning provides a focused approach to known adversaries, CBP offers a more versatile and comprehensive framework that is better suited to the dynamic and uncertain nature of modern security environments. For NATO, which relies on the cooperation and integration of multiple nations' forces, CBP's emphasis on interoperability and adaptability is particularly advantageous. This ensures that NATO can respond effectively to a wide range of potential threats, maintaining readiness and cohesion across its member states. *"…although there are differences in approaches to the concept of capability among countries, the outcome of each planning process has not hindered operations in various theaters."* (Correia, 2019).

Application of CBP in International Contexts

CBP has been adopted by defense organizations like NATO to improve coordination and resource optimization among its member states. However, its application is not limited to NATO countries. Global partners, who often possess varied and difficult-to-standardize military capabilities, are also adopting this model to improve their interoperability and operational effectiveness. The ability to adapt CBP to different national contexts is crucial to ensure that armed forces can effectively respond to emerging threats and operate jointly in international operations.

In the case of Colombia, the experience in riverine operations has demonstrated the importance of adapting capabilities to local conditions. According to the document "Improving the U.S. Navy Riverine Capability: Lessons from the Colombian Experience" Colombian riverine forces have developed innovative tactics to control rivers and secure communication lines, which has been crucial in confronting insurgent and narcoterrorist groups. (Flores, 2007)

In Colombia, the extensive experience gained from riverine operations has highlighted the vital need to tailor military capabilities to the specific local conditions found in the country's varied river systems. Colombian riverine forces have crafted a variety of innovative tactics and approaches to effectively manage river control and secure communication routes, which have been essential in their campaigns against insurgent and narcoterrorist organizations, including FARC, ELN, and various drug trafficking groups. These strategies involve the strategic collection of intelligence and natural surveillance to pinpoint and leverage key river nodes and enemy choke points, facilitating precise and effective operations. Additionally, Colombian forces have focused on creating adaptable and resilient riverine units, such as the Light Riverine Combat Element and the Riverine Support

Patrol Boat, which can operate in both primary and secondary waterways. This flexibility has allowed them to exert control over around 70% of the nation's navigable rivers, significantly hindering the activities of illegal groups and aiding in the reestablishment of economic stability and state authority in previously contested regions. The Colombian case provides important insights into how riverine capabilities can be integrated with broader military and strategic goals, emphasizing the necessity for ongoing innovation and adaptability in response to changing threats.

On the other hand, the document "Logistics challenges in America Latina: Case Colombia" highlights the logistical challenges faced by Colombia due to its mountainous geography and lack of adequate infrastructure. These challenges underscore the need for capabilities-based planning that can address logistical limitations and improve operational efficiency in complex contexts.(Rodriguez, 2024)

Capabilities-Based Planning and Military Logistics

Capabilities-based planning (CBP) is an approach that allows armed forces to identify and develop the necessary capabilities to face a variety of operational scenarios. This approach is crucial in the context of military logistics, where efficiency and adaptability are essential for the success of operations. In Latin America, and specifically in Colombia, logistical challenges are significant due to deficient infrastructure and the lack of international treaties that allow for an adequate flow of goods and services with continental partners. According to the document "Logistics challenges in America Latina: Case Colombia," the quality of transportation infrastructure and the inefficiency of customs processes are major barriers affecting logistical performance (Rodriguez, 2024). These challenges highlight the need for a CBP approach that can address these limitations and improve operational efficiency, especially focused on the country's ability to effectively respond to difficulties that may arise in commercial processes.

The logistics and infrastructure challenges faced by Colombia, underscore the necessity for a Capabilities-Based Planning (CBP) approach. This approach can significantly enhance the country's ability to respond effectively to the complexities of commercial processes. CBP focuses on developing flexible and adaptable capabilities that can be tailored to meet a wide range of scenarios, which is crucial given Colombia's diverse geographical and infrastructural landscape. By prioritizing the development of robust transportation networks, including roads, railways, and waterways, CBP can help mitigate the high logistics costs and inefficiencies currently plaguing the country.

Moreover, CBP can facilitate the integration of advanced technologies and innovative practices in customs clearance processes, reducing delays and improving the predictability of trade operations. This is particularly important in Colombia, where the digitization of customs procedures has already shown promise in enhancing efficiency. By aligning infrastructure development with strategic economic goals, CBP can also support the expansion of intermodal transport systems, thereby improving connectivity between major ports and industrial hubs. This would not only lower transportation costs but also boost Colombia's competitiveness on a global scale.

Furthermore, CBP's emphasis on interoperability and standardization can aid in harmonizing Colombia's trade practices with international standards, fostering smoother cross-border transactions. By addressing these logistical and infrastructural challenges through a CBP framework, Colombia can better position itself to capitalize on trade opportunities and drive sustainable economic growth.

Logistical Challenges in Colombia

Colombia faces unique logistical challenges due to its mountainous geography and lack of adequate infrastructure. The road infrastructure is particularly deficient, resulting in high logistical costs and delays in transporting goods from ports to major cities. The document "Logistics challenges in America Latina: Case Colombia" highlights that Colombia ranks 97th in road connectivity and 104th

in road infrastructure quality worldwide, indicating poor performance in these aspects (Rodriguez, 2024). However, there is a path outlined for the country's modernization in technological aspects, such as the implementation of infrastructure projects like fourth and fifth generation (4G and 5G) projects, which are crucial for improving connectivity and reducing long-term logistical costs. Additionally, the digitalization of its customs clearance processes has improved procedures that allow for the rapid release of goods for the proper development of commercial logistics areas at the national level.

Importance of Logistics in Strategic Objectives

Logistics is a fundamental component for achieving strategic objectives in the military domain. Efficient logistics not only ensures the timely supply of resources and equipment but also allows armed forces to maintain flexibility and responsiveness to changing situations. In the context of CBP, logistics should be seen as a critical capability that must be continuously developed and optimized. The ability to rapidly mobilize and deploy forces can be a decisive factor in the success of military operations. Moreover, well-planned and executed logistics can enhance interoperability among allied forces, which is essential for joint operations within alliances like NATO. In summary, logistics not only supports military operations but also serves as a key enabler for achieving strategic objectives at both national and international levels

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Case Study: Colombian Military Forces

Context and Transformation of the Public Force

The Colombian military forces have been undergoing a continuous transformation process to address the security challenges presented by the country's strategic environment. This process has been guided by the Transformation and Future of the Public Force program, which aims to design a flexible, sustainable, and adaptable force structure to meet future challenges (Pineda, 2017) The capabilities-based planning (CBP) methodology has been central to this effort, allowing the armed forces to align their capabilities with strategic priorities and available resources.

Implementation of Capabilities-Based Planning

CBP in Colombia focuses on translating political guidelines and strategic defense and security priorities into prioritized capabilities for development. This approach involves a series of planning stages, including political and strategic direction, capabilities planning, portfolio structuring, and portfolio management (Pineda, 2017) The methodology enables the armed forces to identify capability gaps and formulate both material and non-material solutions to close them, ensuring that the forces can respond to current and future threats.

Evaluation and Monitoring of Capabilities

A key component of CBP is the continuous evaluation of current capabilities compared to those required for the future. This is done through a capabilities monitoring system that assesses the readiness and fulfillment of capabilities across various units of the Public Force. This system provides critical information for strategic and operational planning, ensuring that the forces are prepared to face any challenge.

Logistics as a Tool for Strategic Approach

Logistics plays a critical role in the strategic planning and operational effectiveness of the Colombian Military Forces. The ability to mobilize and sustain forces in remote and challenging terrains is essential for maintaining national security and sovereignty. This capability ensures that the armed forces can respond swiftly and effectively to various threats, whether they are internal or external, conventional or unconventional.

The implementation of a capabilities monitoring system is a vital component of this logistical framework. Such a system allows the military to continuously assess and evaluate their logistical and operational capabilities. This ongoing evaluation is crucial for identifying and addressing capability gaps, ensuring that the forces remain prepared to face any challenges that may arise.

Maintaining a high level of readiness and availability of capabilities. This approach focuses on the availability of capabilities rather than their immediate use, ensuring that the military is always prepared for potential threats. The capabilities monitoring system supports this by providing real-time data and insights into the state of readiness and the effectiveness of logistical operations (Pineda, 2017).

This means that the logistics system must be flexible enough to adapt to changing operational environments and strategic demands. By leveraging existing resources and capabilities, the armed forces can optimize their logistical operations without necessarily acquiring new platforms, thus ensuring efficient use of resources *"Resource focused planning considers available resources as a limit and looks at priorities, tradeoffs, and substitution opportunities to meet the most possible potential demands from a finite resource base"*. (Mazarr & Lei Best, s. f.)

In summary, logistics is a cornerstone of the Colombian military's strategic objectives, and the capabilities monitoring system is an essential tool for ensuring that logistical and operational capabilities are continuously evaluated and optimized. This ensures that the military remains agile, responsive, and capable of maintaining the country's security and sovereignty.

The case of the Colombian military forces illustrates how capabilities-based planning can be effectively applied to transform and enhance military capabilities in a complex operational environment. The Colombian experience offers valuable lessons for other nations facing similar challenges, highlighting the importance of adaptability, innovation, and the integration of logistical and operational capabilities for success on the battlefield.

Implementation of CBP in Europe

In Europe, capabilities-based planning is a well-established approach, especially within NATO and the European Union. These organizations have developed robust frameworks for defense planning that allow member countries to coordinate their capabilities and resources effectively. NATO, for example, uses CBP to ensure that allied forces can operate jointly and effectively across a variety of scenarios. This approach focuses on interoperability and standardization, facilitating cooperation among different armed forces (Davis, 2002).

European countries tend to have more developed logistical infrastructures and broader financial resources, allowing them to implement CBP more effectively. Additionally, shared experience and joint exercises within NATO provide a common framework that helps overcome national barriers and optimize collective capabilities.

Implementation of CBP in Latin America: The Case of Colombia

In contrast, Latin American countries, such as Colombia, face unique challenges in implementing CBP due to infrastructure and resource limitations. According to the document "Planeación Basada en Capacidades, Herramienta de Gestión para la Transformación y Futuro de la Fuerza Pública en Colombia," CBP in Colombia focuses on closing capability gaps through resource optimization and aligning capabilities with strategic objectives (Pineda, 2017).

Colombia has adopted CBP as part of its Transformation and Future of the Public Force program, seeking to design a flexible and sustainable force structure that can address the challenges of a changing operational environment. However, the country faces significant challenges in terms of logistical infrastructure, as highlighted in the document "Logistics challenges in America Latina: Case Colombia," where the quality of transportation infrastructure and the efficiency of customs processes are critical areas that require improvement (Rodriguez, 2024).

Comparison and Lessons Learned

The comparison between Europe and Latin America in the implementation of CBP reveals significant differences in terms of available resources, infrastructure, and operational experience. While European countries can benefit from well-established frameworks and ample resources, Latin American countries must face more complex logistical and financial challenges.

However, the case of Colombia offers valuable lessons on how CBP can be adapted to contexts with limited resources. The flexibility and adaptability of CBP allow the Colombian armed forces to prioritize critical capabilities and optimize resource use, which is essential for addressing emerging threats and improving operational efficiency.

Although there are significant differences in the implementation of CBP between Europe and Latin America, the approach offers important benefits in both contexts, allowing armed forces to align their capabilities with strategic objectives and enhance their responsiveness to future challenges.

Conclusions

Capabilities-based planning (CBP) has proven to be an effective tool for the transformation and modernization of military forces, both in Europe and Latin America. In Europe, CBP has facilitated interoperability and standardization among NATO member countries, optimizing resource use and improving joint response capabilities. This approach has allowed European armed forces to quickly adapt to a changing security environment, ensuring they are prepared for a variety of operational scenarios (Pineda, 2017).

In Latin America, the case of Colombia highlights how CBP can be adapted to contexts with limited resources. Despite logistical and infrastructure challenges, Colombia has implemented CBP as part of its Transformation and Future of the Public Force program, prioritizing critical capabilities and optimizing resource use. This has allowed the Colombian armed forces to improve their operational efficiency and responsiveness to emerging threats (Rodriguez, 2024). The Colombian experience underscores the importance of CBP's flexibility and adaptability, allowing armed forces to evolve according to changes in the operational environment.

The comparison between Europe and Latin America reveals that, although there are significant differences in the implementation of CBP, the approach offers important benefits in both contexts. The ability to align military capabilities with strategic objectives is crucial for addressing 21st-century security challenges, where rapid response and adaptability are essential for success (Pineda, 2017; Rodriguez, 2024).

Recommendations

To maximize the benefits of CBP, it is recommended that Latin American countries continue to strengthen their logistical infrastructures and improve the efficiency of their administrative processes. This could include investments in technology for process digitalization and the improvement of transportation infrastructure, which would facilitate more efficient and effective logistics (Rodriguez, 2024). Additionally, fostering regional cooperation and exchanging best practices with European countries could provide valuable lessons and experiences to help overcome current challenges. Finally, it is crucial for armed forces to maintain a focus on innovation and continuous improvement, ensuring that their capabilities evolve according to the changing needs of the strategic environment (Pineda, 2017).

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CURRENT STATE OF ICT DEVELOPMENT IN TUNISIA

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Abstract:
This article provides an overview of the current state of ICT development in Tunisia, examining key components such as the country's broadband and mobile networks, the growing digital economy, and the development of key ICT sectors including e-government, e-education, e-health, and fintech. It also highlights the roles played by both the public and private sectors in driving this progress, as well as the challenges and opportunities that lie ahead.

Keywords: *Information and Communication Technology (ICT); the growing digital economy; economic growth*
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Introduction

The Information and Communication Technology (ICT) sector has become a critical driver of economic development in Tunisia, playing a significant role in shaping the country's modernization and global competitiveness. Over the past two decades, Tunisia has made notable progress in expanding its ICT infrastructure, improving broadband connectivity, and fostering innovation across various sectors. With a robust mobile network, increasing internet penetration, and advancements in digital services, Tunisia is positioning itself as a leader in the digital economy in North Africa.

This article provides an overview of the current state of ICT development in Tunisia, examining key components such as the country's broadband and mobile networks, the growing digital economy, and the development of key ICT sectors including e-government, e-education, e-health, and fintech. It also highlights the roles played by both the public and private sectors in driving this progress, as well as the challenges and opportunities that lie ahead.

In examining the state of ICT in Tunisia, this chapter will explore how ICT contributes to economic growth, how Tunisia's infrastructure is evolving, and how the country's regulatory environment and strategic initiatives are supporting the digital transformation of public services and the private sector**.**

1- ICT Infrastructure in Tunisia

Tunisia has been continuously investing in its ICT infrastructure to support digital transformation and economic growth. The country's ICT infrastructure is robust and has evolved in recent years, encompassing various essential components such as broadband, mobile networks, data centers, and other digital technologies.

1.1: Broadband Infrastructure

Tunisia's broadband infrastructure is expanding, allowing more citizens and businesses access to high-speed internet. The country is primarily served by fixed broadband services (DSL and fiber optics) and mobile broadband (3G, 4G, and soon 5G). Fixed broadband networks are concentrated in urban areas, but the government has initiated projects to extend coverage to rural regions, promoting digital inclusion.

The fiber-optic network has been growing in recent years, improving the quality and speed of internet connections for homes and businesses. As a result, Tunisia's broadband internet speed has improved, enhancing the ability to engage in cloud-based services, e-commerce, and online education.

1.2: Mobile Networks

Mobile networks in Tunisia are quite advanced, with three major mobile operators: **Tunisie Telecom**, **Ooredoo**, and **Orange Tunisia**. These companies provide extensive coverage for 3G, 4G LTE, and are in the process of rolling out 5G. The mobile penetration rate is high, with a large proportion of the population using smartphones and mobile internet. Mobile services also play a key role in providing access to essential services like digital payments, banking, and social media.

5G technology is particularly promising for Tunisia's future development in sectors such as smart cities, autonomous systems, and the Internet of Things (IoT), which require faster speeds and lower latency for real-time communication.

1.3: Data Centers and Cloud Services

Tunisia's data center infrastructure is growing in importance as demand for digital services increases. Data centers in the country are primarily focused on hosting services, including cloud computing, disaster recovery, and business continuity solutions. Companies across sectors are adopting cloud-based solutions to scale their operations, reduce IT costs, and ensure data security.

To keep pace with global demands, several data centers are being developed to provide scalable cloud infrastructure. The **Tunisia Data Center**, for example, offers colocation and managed services, which are essential for businesses and government institutions looking to store and manage sensitive data in a secure and compliant environment.

1.4: Government Initiatives to Enhance ICT Infrastructure

The Tunisian government has been proactive in enhancing ICT infrastructure as part of its broader strategy to develop a digital economy. Key initiatives include expanding the availability of broadband, supporting the establishment of digital parks, and driving regulatory reforms to encourage private investment in the sector.

The **National Broadband Plan** aims to expand fiber-optic networks across the country, and initiatives like **e-government** and **smart city** programs are pushing the ICT agenda forward, laying the foundation for more advanced digital services and infrastructure.

1.5: International Connectivity

Tunisia benefits from strong international connectivity via submarine cables that link the country to Europe, the Middle East, and sub-Saharan Africa. Tunisia is connected to the **MedNautilus** cable system and other international systems, providing reliable high-speed access for international communication, data exchange, and online services.

2- Digital Economy: How ICT contributes to the economy (e-commerce, tech startups, digital services).

ICT has become a cornerstone of Tunisia's digital economy, driving growth and innovation in several sectors:

2.1. E-Commerce in Tunisia: Development and Growth

The e-commerce sector in Tunisia has experienced significant growth in recent years, driven by both increasing consumer adoption and the expansion of digital infrastructure. More and more Tunisians are turning to online shopping, with a growing number of people utilizing digital payment methods such as mobile wallets, credit cards, and online banking to make purchases. This shift towards e-commerce reflects broader trends in global digitalization, where consumers are increasingly comfortable shopping online for convenience, variety, and competitive prices.

Tunisia's businesses, from small startups to large enterprises, have been quick to embrace e-commerce platforms to expand their market reach both locally and internationally. Many startups are now leveraging e-commerce tools to launch new products and services, while established companies are enhancing their online presence to meet the evolving expectations of consumers. The availability of e-commerce platforms has enabled businesses to tap into new revenue streams, create new job opportunities, and boost Tunisia's digital economy.

Leading players in Tunisia's e-commerce landscape, such as Jumia Tunisia and other local e-commerce websites, have strengthened their position by offering a wide array of products, ranging from electronics and fashion to groceries and household goods. These platforms have simplified the shopping experience, providing users with easy access to various goods and services, while also offering delivery and secure payment options, which further build consumer trust.

To support the growth of the e-commerce sector, the Tunisian government has implemented several policies aimed at fostering a conducive environment for digital commerce. These include tax incentives for businesses engaged in e-commerce, improved digital payment infrastructure, and efforts to streamline logistics, making it easier for businesses to deliver products to customers efficiently. Furthermore, the government has also worked to increase the regulatory framework that addresses consumer protection, creating a safer online shopping experience.

Despite these successes, the e-commerce sector in Tunisia still faces challenges, such as limited internet access in rural areas, a need for more advanced digital payment solutions, and issues related to delivery logistics. However, the continuous development of Tunisia's digital infrastructure, along with supportive government policies, indicates that the e-commerce industry is poised for further growth, potentially transforming the country's retail sector and contributing significantly to its economy.

2.2:Tech Startups

Tunisia has a thriving tech startup ecosystem, with a growing number of companies focused on software development, mobile apps, and digital services. These startups are fostering innovation, particularly in areas like fintech, healthcare, and education. The **Tunisian Startup Act**, passed in 2018, has created a legal and financial framework to support entrepreneurs with tax exemptions, grants, and easy access to funding**.**

2.3: B2B and B2C startups

Tunisia has witnessed an increase in both business-to-business (B2B) and business-to-consumer (B2C) digital platforms. These startups are now being supported by a range of incubators, accelerators, and venture capital firms that are helping them scale and access international markets.

2.4: Digital Services

The increasing reliance on ICT has fostered a growing digital services industry. From cloud computing to data analytics and cybersecurity, Tunisia is becoming a hub for digital services, especially for North African and Mediterranean companies looking to digitize operations. The **outsourcing industry** also plays a significant role, with companies offering IT services and software development to international clients.

3- Key ICT Sectors

The growth of ICT infrastructure has fueled the development of various ICT sectors in Tunisia. These sectors play a critical role in the national economy, contributing to innovation, job creation, and digital transformation across industries. Here's a closer look at the most prominent ICT sectors in Tunisia.

3.1: Telecommunications and Mobile Networks

The telecommunications sector remains one of the most significant drivers of Tunisia's ICT landscape. It is dominated by key players such as **Tunisie Telecom**, **Ooredoo**, and **Orange Tunisia**. These companies are pivotal in providing mobile services, broadband, and related products across the country.

The sector's growth is closely tied to the increasing demand for mobile data services, driven by smartphone penetration, the expansion of mobile banking, and digital content consumption. The ongoing rollout of 5G networks is expected to further accelerate innovation in sectors like **smart cities**, **autonomous vehicles**, and **IoT**.

3.2: Software Development and IT Services

Tunisia has seen the rise of a vibrant software development and IT services sector. Local companies are developing customized software solutions for businesses in finance, healthcare, education, and government. The software development ecosystem is also bolstered by a strong startup culture, with young entrepreneurs creating innovative solutions to address both local and international market needs.

In addition to traditional software development, Tunisia has become a hub for **outsourcing services**, offering competitive rates for IT services such as application development, software testing, and customer support. Tunisia's skilled workforce and favorable time zone for European clients make it a highly attractive destination for **nearshoring**.

3.3: Cybersecurity

With the increasing digitalization of services and the growing reliance on online platforms, **cybersecurity** has become a crucial focus for both the private and public sectors in Tunisia. Cyber-attacks are becoming more sophisticated, and Tunisia is investing in robust cybersecurity measures to protect its national infrastructure.

The country has developed initiatives to bolster its cybersecurity workforce and institutions. In addition to establishing **cybersecurity awareness programs** and **security operations centers**

(SOCs), Tunisia is working to implement cybersecurity standards for critical sectors such as finance, healthcare, and energy.

3.4: FinTech (Financial Technology)

Tunisia's **FinTech sector** is growing rapidly, driven by the increasing demand for digital payment solutions, mobile banking, and e-commerce. The government's adoption of digital banking regulations has paved the way for innovative financial solutions, including **mobile wallets**, **peer-to-peer lending**, and **blockchain-based systems**.

Startups in the FinTech space are leveraging technologies like **digital currencies**, **contactless payments**, and **online lending platforms** to transform the financial services industry. The use of FinTech solutions has also helped promote financial inclusion, allowing underbanked populations to access financial services remotely.

3.5: Cloud Computing and Data Management

As businesses in Tunisia continue to embrace digital transformation, the demand for **cloud computing** and **data management solutions** is increasing. Tunisian companies are leveraging the cloud for data storage, **enterprise resource planning (ERP)** systems, and other services, reducing the need for expensive, on-site infrastructure.

The growth of **public cloud** providers and **data centers** is creating a competitive environment for cloud services, encouraging innovation and the adoption of **Software-as-a-Service (SaaS)** products. Local startups are also offering customized cloud services, particularly for SMEs (small and medium-sized enterprises).

3.6: Artificial Intelligence (AI) and Big Data

Tunisia is positioning itself as a player in the emerging fields of **Artificial Intelligence (AI)** and **Big Data** analytics. The country is investing in the development of **AI-powered** solutions, especially in sectors such as **healthcare**, **education**, **finance**, and **agriculture**.

AI and machine learning technologies are being integrated into solutions that help businesses optimize operations, improve customer experiences, and make data-driven decisions. **Big data** analytics is helping industries unlock valuable insights from vast amounts of data, which is crucial for sectors like retail, logistics, and manufacturing.

3.7: Smart Cities and IoT (Internet of Things)

Tunisia is actively exploring **smart city** solutions to improve urban life, optimize resource management, and promote sustainability. **IoT technologies** are central to the development of smart city infrastructures such as **smart traffic systems**, **energy-efficient buildings**, and **waste management systems**.

Tunis and other major cities are implementing pilot projects to monitor air quality, manage traffic flow, and improve public safety through IoT devices. The government is collaborating with international partners to build smart city ecosystems, which will lay the foundation for future urban planning.

3.8: E-Health

The **e-health** sector is growing rapidly, fueled by the need to modernize healthcare services in Tunisia. The development of **telemedicine** platforms, **electronic health records (EHR)** systems, and **mobile health applications** is revolutionizing the way healthcare services are delivered, particularly in remote areas.

E-health startups are innovating with AI-driven diagnostic tools and remote monitoring solutions, helping to improve the accessibility and efficiency of healthcare services across the country. The government's support for digital health initiatives is also encouraging investments in health technology.

4 - Public vs Private Sector : Roles in Driving the ICT Agenda. Government and Private Sector Collaboration

The ICT development in Tunisia has been driven through a combination of government initiatives and private sector investments. Both sectors play crucial roles in shaping the future of ICT in the country.

4-1: Government Role

The Tunisian government has been at the forefront of developing ICT infrastructure and promoting the digital economy. With policies such as the **Tunisia Digital 2020** initiative, the government aims to make Tunisia a regional hub for ICT, emphasizing the importance of modernizing public administration, promoting entrepreneurship, and improving ICT infrastructure.

4.2: Public Sector Funding and Support

Through public investments in ICT infrastructure, such as expanding broadband access and building data centers, the government has laid the foundation for a growing digital economy. The government also offers **subsidies, tax incentives, and grants** to ICT startups and companies.

4.3: Regulatory Framework

The government has introduced policies and regulations to ensure the development of a secure digital environment, including **data protection laws**, **cybersecurity regulations**, and guidelines for the use of emerging technologies such as blockchain and AI.

4.4: Private Sector Role

Private companies have been instrumental in expanding Tunisia's ICT infrastructure, particularly in telecommunications and tech startups. Companies like **Tunisie Telecom**, **Ooredoo Tunisia**, and **Orange Tunisia** have played a key role in improving connectivity, particularly through mobile networks and broadband services.

4.5: Tech Startups

Tunisia has a high internet penetration rate, with over 80% of its population having access to the internet as of 2023. Tunisia has become a hub for tech startups, with more than 500 registered companies in the ICT sector. Additionally, the government has been actively promoting digital transformation through initiatives such as the "Digital Tunisia 2020" strategy, which aims to increase the digital economy's contribution to GDP by 10%. The country is also home to a growing pool of tech talent, with over 10,000 graduates in engineering and computer science fields each year. Tunisia's ICT export revenues reached approximately $1.5 billion in 2022, showing the sector's growing importance in the global market.

4.6: Collaboration with International Tech Giants

Tunisia is attracting foreign investment from multinational companies like **Microsoft**, **Google**, and **IBM**, which are establishing partnerships and innovation hubs. This collaboration brings not only financial investment but also access to global technology and expertise, boosting the country's **ICT** capabilities.

5. Perspective of ICT in Tunisia

The perspective of ICT in Tunisia is exceptionally bright, driven by advancements in **5G** technology, **AI**, and IoT, which will revolutionize sectors like healthcare, agriculture, and finance. The government's commitment to digital transformation through e-government initiatives and robust cybersecurity measures will ensure a secure and efficient digital ecosystem. Financial inclusion will be accelerated by digital payment solutions and mobile banking, providing greater access to underserved populations. The growing tech startup ecosystem and investment in digital education will nurture a skilled workforce, fueling innovation. Tunisia's focus on sustainability will see **ICT**

driving green technologies, smart cities, and energy-efficient solutions. With these strategic developments, Tunisia is set to emerge as a leading digital economy **hub in North Africa**, poised for a tech-driven, inclusive, and sustainable future.

ANNEX :

ICT: A Statistical Analysis

The population of Tunisia stood at 12.51 million in January 2024		
Indicator	**Value**	**Source**
Internet Penetration Rate	76.6% (estimated)	International Telecommunication Union (ITU)
Mobile Phone Penetration	120% (more mobile subscriptions than the population)	National Institute of Statistics (INS)
Fixed Broadband Subscription	1.3 million subscribers	National Regulatory Authority for Telecommunications (INPT)
Mobile Broadband (4G) Subscribers	9.96million	National Telecommunications Regulatory Authority (INT)
Number of Internet Users	8 million	National Telecommunications Regulatory Authority (INT)
E-Government Services	Over 300 public services available online	National Telecommunications Regulatory Authority (INT)
ICT Contribution to GDP	5.8% of total GDP	World Bank, ITU Report
ICT Startups	Over 1,000 active startups	Ministry of Communication Technologies
Fiber Optic Coverage	~35% of total population covered	Tunisian Telecom
Cybersecurity Incidents	1,200+ cyberattacks reported annually	CERT Tunisia (Tunisian Computer Emergency Response Team)

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-Tunisian Telecom
-CERT Tunisia (Tunisian Computer Emergency Response Team)
-https://www.google.com/search?q=-Tunisian+Telecom&oq=-

CYBERSECURITY CHALLENGES AND INNOVATIVE SOLUTIONS FOR INFORMATION ASSURANCE IN MILITARY NETWORKS

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Abstract:
The rapid evolution of military operations in cyberspace has introduced unprecedented challenges to information assurance within military networks. These networks are frequent targets of advanced persistent threats (APTs), zero-day vulnerabilities, and insider risks, which can compromise operational readiness and national security. Traditional security mechanisms are no longer sufficient to address the sophistication and persistence of modern cyberattacks. This paper discusses the current cybersecurity challenges faced by military organizations and presents innovative approaches to strengthen defense capabilities. Key solutions include the deployment of next-generation firewalls, intrusion detection and prevention systems (IDPS), and the integration of artificial intelligence for real-time monitoring and anomaly detection. Special emphasis is placed on the need for adaptive and resilient security architectures capable of responding dynamically to evolving threats. The study provides insights into best practices and highlights future directions for enhancing the security posture of military information networks, ensuring confidentiality, integrity, and availability of sensitive data.

Keywords: *cybersecurity, military networks, information assurance, advanced persistent threats, intrusion detection, artificial intelligence.*

Introduction

In today's defense environment, information and communication systems are key elements of every military operation. Data moves constantly between soldiers, command centers, and allied forces. The speed and reliability of these systems often decide the success or failure of a mission. However, as technology grows, so do the risks. Modern militaries face a wide range of cyber threats that can target networks, equipment, and even decision-making processes. Because of this, cybersecurity has become one of the most important parts of national defense.[12]

Cyberattacks are now used as tools of hybrid warfare. Adversaries can launch attacks that steal classified data, interrupt communication, or spread false information. These actions can weaken military capability without a single shot being fired. Unlike physical attacks, cyber threats are invisible, fast, and can come from anywhere in the world. This makes defense more complex and requires constant vigilance. Every system, from tactical radios to satellites, must be protected against intrusion and manipulation.

At the same time, the human factor remains one of the biggest vulnerabilities. Even advanced systems can be compromised through small mistakes such as weak passwords, lost devices, or ignoring security rules. For this reason, training and awareness programs are essential. Every service

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[12] "Cyber Threats and NATO 2030: Horizon Scanning and Analysis." Tallinn, 2021

member must understand that protecting data is a shared responsibility, not just the job of cybersecurity experts. Building a strong cyber culture across all levels of the armed forces is a critical step in achieving reliable information assurance.[13]

To respond to these challenges, modern militaries are adopting innovative approaches. New technologies like Artificial Intelligence, machine learning, and zero-trust network models are being used to detect, analyze, and respond to attacks more effectively. These solutions allow faster identification of threats and stronger protection of mission-critical information. However, technology alone cannot solve every problem. The real strength lies in combining advanced tools with trained people and clear defense policies.

The purpose of this article is to examine the main cybersecurity challenges that military organizations face today and to explore the innovative solutions that support information assurance in military networks. By understanding both the technical and human sides of cybersecurity, armed forces can improve resilience, protect operational data, and maintain superiority in the digital battlefield.

1. Cybersecurity in the age of hybrid warfare

Military networks form the digital backbone of modern defense operations. These systems connect command centers, field units, intelligence services, and allied forces in real time. Information moves rapidly through different layers of security, supporting decision-making and mission success. However, as military structures become more dependent on technology, they also become more exposed to cyber threats. The protection of information and communication systems has therefore become a strategic priority for every modern army.[14]

Cybersecurity in the military environment is not only about protecting data but also about maintaining operational capability. A cyberattack can disrupt communication, alter mission data, or disable essential systems. Unlike traditional warfare, cyberattacks can come without warning, cross national borders instantly, and leave no visible trace. This makes detection and defense much more difficult. Fig. 1 below presents a simplified model of a military network structure, showing how multiple components: command, control, intelligence, and logistics, are connected through secure digital channels. A single vulnerability in this chain can endanger the entire mission.

Cyber threats are becoming more advanced and persistent. Many are carried out by state-sponsored groups that aim to collect sensitive information or weaken an opponent's defense capacity. These threats include phishing attacks, data breaches, and advanced malware designed to stay hidden for long periods. At the same time, the integration of new technologies such as artificial intelligence, autonomous systems, and the Internet of Things increases the complexity of the military cyber environment. Each new connection adds potential entry points for attackers.[15]

[13] U.S. Department of Defense. "DoD Cyber Strategy." Washington D.C., 2023.

[14] *Ibidem* "Cyber Threats and NATO 2030"

[15] EDA Whitepaper: Trustworthiness for Artificial Intelligence in Defence, 2025.

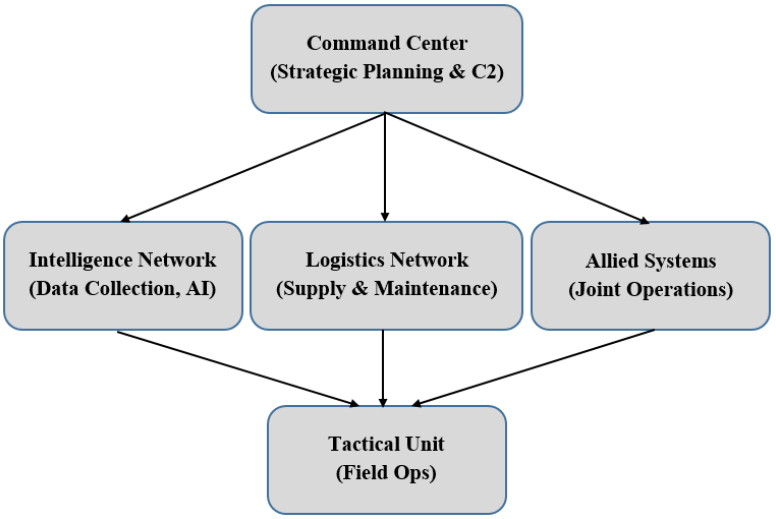

Fig. 1: Structure of a military communication and information network: showing hierarchical links between command centers, intelligence, logistics, and tactical units with allied systems integration.

Another important aspect is the human factor. Even with modern security systems, human error remains one of the main causes of security breaches. Weak passwords, unverified links, or neglecting cybersecurity procedures can compromise entire networks. For this reason, continuous training, discipline, and awareness among all personnel are vital elements of information assurance.[16]

Cybersecurity challenges in military networks are a combination of technical vulnerabilities, human risks, and rapidly evolving digital threats. Understanding how these elements interact is essential for developing strong defense strategies. This chapter aims to analyze the main challenges faced by military organizations and to identify key areas where improvements can strengthen information assurance and mission success.

1.1 Complexity and structure of military networks

Modern military networks are complex systems that connect command centers, field units, and intelligence platforms across multiple domains: land, air, sea, space, and cyber. These systems must operate continuously, even under attack or during extreme conditions. The integration of advanced technologies such as satellites, sensors, drones, and data analysis tools has created a highly interconnected environment. While this improves operational efficiency, it also increases the number of possible entry points for cyber threats.[17]

One of the main challenges comes from the use of legacy systems that were not originally built for modern digital communication. Many military platforms, especially older ones, still rely on outdated hardware and software. When these are connected to modern networks, they often become

[16] Cyber Resilience Strategy for Defence al UK, 2022.

[17] NATO CCDCOE. "The Evolution of Cyber Forces in NATO Countries." Tallinn, 2022..

weak spots that adversaries can exploit. Fig. 2 presents a simplified diagram of how traditional systems are linked with newer digital components within a military network. This mix of generations, old and new, creates complex dependencies that are hard to secure.

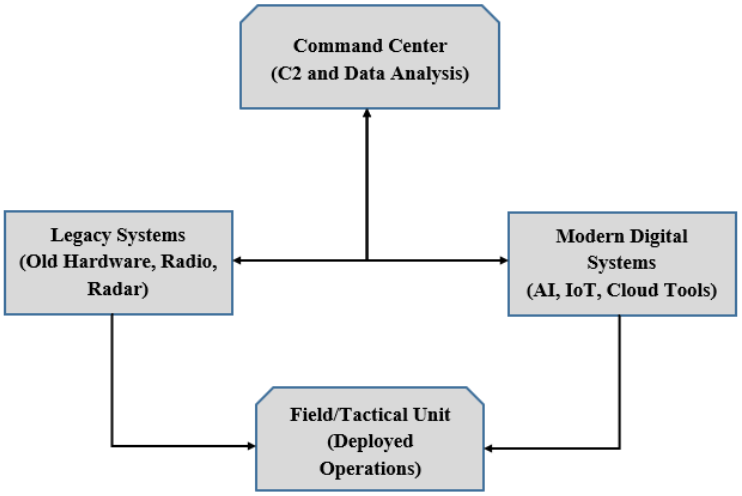

Fig. 2: Example of integrated legacy and modern systems within a military network, showing data exchange between command centers, legacy systems, and advanced digital platforms.

Another issue is network interoperability. Military operations often require coordination between different branches and allied forces. Each organization may use different encryption methods, software protocols, and security standards. Ensuring that all these systems communicate safely and effectively is a technical and organizational challenge. Cybersecurity policies must therefore focus not only on individual system protection but also on the secure integration of all components.[18]

The volume of data circulating in these networks is enormous. Command decisions depend on accurate and timely information, and any delay or alteration can affect mission outcomes. Secure data management and network segmentation are necessary to maintain both speed and protection. The military must balance openness for communication with strict control for information assurance. The complexity of military networks lies in their scale, diversity, and constant evolution. The combination of old technologies, new digital systems, and cross-branch cooperation increases both capability and vulnerability. Understanding this structure is essential for developing strong cybersecurity strategies that protect the integrity of information and ensure mission continuity.

2. Human factors and strong cyber awareness

Technology alone cannot secure a military network. Even the most advanced systems can be compromised if the people who use them make mistakes or ignore basic security rules. In many cases, cyber incidents occur not because of technical failure but because of human error. This makes the human factor one of the most critical elements in maintaining cybersecurity and information assurance in military environments.

Human factors refer to the behaviors, decisions, and awareness levels of all personnel who interact with digital systems. Soldiers, officers, and civilian staff each play a role in protecting classified data. A single careless action, such as opening a phishing email, using an unsecured device, or sharing a password, can expose an entire network to attack. For this reason, cyber awareness must be considered a core component of military training and culture, not just a technical matter.[19] Fig. 3 below shows the relationship between Human Awareness, Technology Use, and

[18] U.S. Department of Defense, Office of the Chief Information Officer. "Department of Defense Zero Trust Strategy." Washington, D.C., 2022.

[19] "Cyber Hygiene: Practices for Secure Use of Digital Tools." Tallinn, 2022.

Operational Discipline. These three areas overlap to form a "cyber defense culture" that supports information assurance. Awareness ensures people understand the risks, discipline ensures they follow rules, and technology provides the tools needed to act securely.

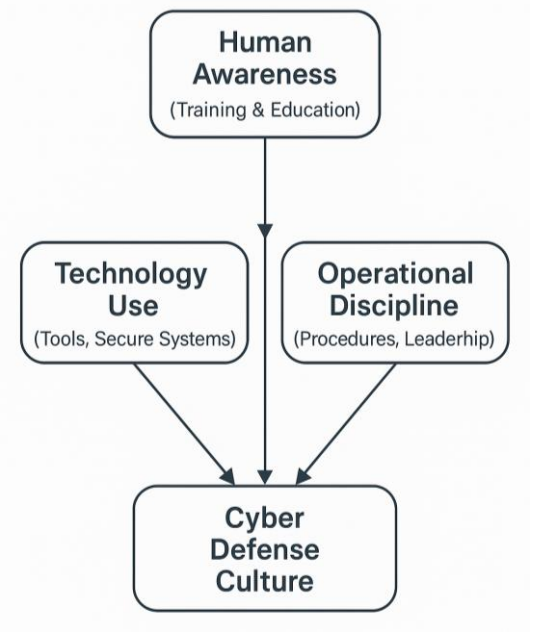

Fig. 3: Relationship between Human Awareness, Technology Use, and Operational Discipline in building a cyber defense culture within military networks.

Building cyber awareness requires continuous education and practice. Military personnel must be trained not only to use secure systems but also to recognize potential threats. Regular cyber exercises, simulations, and incident-response drills help develop habits that reduce risk. Leadership also plays a major role: commanders must promote a culture where cybersecurity is viewed as everyone's responsibility, not just the task of IT departments.

NATO and other defense organizations have shown that units with higher cyber awareness experience fewer incidents and recover faster from attacks. This proves that human behavior directly influences the success of cyber defense. Awareness programs should be realistic, practical, and adapted to operational conditions. The goal is to make secure behavior automatic, part of military discipline, and not an afterthought.[20] Human factors are central to information assurance in military networks. While technology can detect and block threats, only well-trained and disciplined personnel can ensure lasting security. A strong cyber awareness culture strengthens not only network protection but also overall mission readiness.

2.1 Building cyber awareness and training programs in military contexts

Developing strong cyber awareness across military personnel is essential for defending networks and ensuring mission success. Technology alone cannot stop attacks if the people using it are not trained to recognize and react to threats. Building cyber awareness means teaching every service member, from commanders to operators, how their daily actions can affect information security and operational readiness. A single careless click can expose classified data, disrupt communications, or compromise an entire mission. Therefore, education and discipline in cyberspace must become as routine as physical training in the armed forces.[21]

[20] "Cognitive Warfare and the Role of Awareness in Military Environments." Riga, 2022.

[21] Responding to Cognitive Security Challenges (StratCom COE)

Modern training programs in cybersecurity now combine theoretical education with practical exercises that simulate real cyber incidents. These scenarios allow soldiers and officers to experience how a breach unfolds and how to respond quickly. Regular drills also help identify weaknesses in communication and coordination between technical and operational units. According to NATO's Cooperative Cyber Defence Centre of Excellence, continuous training improves not only individual awareness but also teamwork, decision-making, and coordination during cyber incidents.

Implementing cyber awareness programs requires strong leadership support. Commanders must understand that cybersecurity is not just an IT responsibility, but a shared mission objective. When leaders actively promote secure practices and set an example, personnel are more likely to follow. The U.S. Department of Defense's Zero Trust Strategy highlights that awareness and accountability among all users are key principles for building a secure and resilient defense network. Effective cyber training programs transform awareness into discipline and make cybersecurity a fundamental part of military culture. They turn potential vulnerabilities into strengths by ensuring that every person becomes a proactive defender of information. A military force that is cyber-aware is one that can operate confidently, securely, and efficiently in the modern digital battlespace.

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Leadership plays a decisive role in maintaining high awareness levels. Commanders must set the example by following cybersecurity procedures themselves and by promoting a culture of accountability. Awareness programs work best when leaders clearly explain why each policy exists, connecting cyber hygiene to operational safety. When personnel understand that secure digital behavior directly supports mission success, compliance becomes natural rather than forced. The U.S. Department of Defense's Zero Trust Strategy emphasizes that user responsibility and leadership involvement are critical to building resilient defense networks.[23]

Another important element is international cooperation. Modern cyber threats rarely stop at national borders. NATO and partner countries regularly share lessons learned, threat intelligence, and training methodologies to strengthen collective readiness. Joint exercises such as Locked Shields, organized annually by Cooperative Cyber Defence Centre of Excellence (CCDCOE), provide a realistic environment where multinational teams practice defending complex networks under simulated attacks. These exercises show that cyber awareness is not only an individual skill

[22] NATO Strategic Communications Centre of Excellence (StratCom COE). Responding to Cognitive Security Challenges. Riga, 2019.

[23] *Ibidem* "Department of Defense Zero Trust Strategy."

but a collective capability, one that depends on trust, communication, and coordination across nations.

3. Innovative solutions and future directions

The nature of modern warfare is changing rapidly, moving beyond traditional domains into a complex, interconnected digital battlespace. Information has become a weapon, and the ability to secure, manage, and exploit it effectively determines success in both strategic and tactical operations. In this context, innovation is no longer a luxury, it is a necessity for survival. Military cyber defence must evolve continuously, combining technology, human adaptability, and international cooperation to stay ahead of adversaries.

Innovative solutions such as artificial intelligence (AI), machine learning, and autonomous systems are transforming the way armed forces detect, respond to, and recover from cyber incidents. AI-driven algorithms are capable of analyzing massive data streams, recognizing patterns, and identifying potential intrusions in real time. As highlighted by the NATO CCDCOE, integrating AI into military decision-making allows commanders to process complex information faster and make more informed operational choices under pressure.

However, these technological advancements also bring new risks. AI systems can be manipulated, biased, or exploited if not properly secured. The European Defence Agency (EDA) emphasizes the need for trustworthy and transparent AI systems that align with ethical and strategic defence principles. Ensuring accountability and reliability in AI-based operations is crucial to maintaining control, especially when systems operate autonomously in combat or surveillance environments.[24]

The next stage of innovation will focus on developing resilient architectures and Zero Trust environments, where every access point in a military network is continuously verified. Combined with automation and predictive analytics, these technologies enhance situational awareness, improve interoperability among allied forces, and strengthen mission assurance. In the near future, emerging fields such as quantum cryptography and blockchain, based integrity checks are expected to play an important role in securing communications and protecting classified information from advanced cyber threats.

At the same time, innovation is not just about technology, it is about people. Building a culture of innovation within the military requires training, leadership, and cooperation between technical experts and decision-makers. True innovation happens when operators understand both the technical tools and the strategic goals they serve. By fostering continuous learning and cross-domain collaboration, armed forces can develop a flexible mindset capable of adapting to the unpredictable challenges of future cyber conflicts. The future of military cybersecurity lies in integration, trust, and adaptability. Innovative solutions will not replace human judgment but will enhance it, ensuring that military operations remain effective, secure, and ethically grounded. Nations that invest in both advanced technologies and responsible innovation today will be better prepared to defend their sovereignty and operational freedom in the digital age.

3.1 Technological integration and ethical challenges

The integration of advanced technologies such as artificial intelligence (AI), automation, and data analytics into military systems offers significant advantages in speed, precision, and decision-making. Yet, it also introduces new ethical, operational, and security challenges. As militaries increasingly depend on autonomous and semi – autonomous systems, questions arise regarding

[24] European Defence Agency. Trustworthiness for Artificial Intelligence in Defence. Brussels, 2025.

responsibility, control, and the potential consequences of human–machine interaction on the battlefield.

Technological integration in cyber defence requires more than just hardware and software compatibility; it demands a unified approach to policy, training, and doctrine. Systems must communicate across branches, allies, and operational levels while maintaining confidentiality and interoperability. According to the NATO CCDCOE, the main obstacle is ensuring that emerging technologies remain both secure and understandable to human operators, avoiding what experts call the "black box problem", when decisions are made by algorithms that humans cannot fully explain.[25] The EDA stresses the principle of human oversight, ensuring that all AI-enabled defence systems remain under meaningful human control, especially in life-critical or mission-critical operations.

Transparency and accountability must therefore become core principles of future cyber defence architectures. Military innovation must include ethical evaluations during design and deployment, not just after incidents occur. Proper integration means aligning technology with human values and command structures, ensuring that machines enhance decision-making rather than replace it. To visualize this balance between technological benefit and ethical responsibility, Table 1 summarizes key opportunities and challenges associated with integrating emerging technologies into military cyber operations.

Technology	Main Benefits	Key Ethical/Operational Challenges
Artificial Intelligence (AI)	Real-time threat detection and automated response	Algorithmic bias; lack of transparency ("black box" effect)
Automation & Robotics	Faster reaction and reduced human workload	Accountability in autonomous decisions; overreliance on systems
Data Analytics & Predictive Tools	Early identification of attacks; improved situational awareness	Privacy risks; false positives affecting mission reliability
Quantum Cryptography	Stronger data protection and resilience against decryption	Limited maturity; potential arms race implications
Blockchain Security Systems	Immutable data integrity and traceability	Complexity of implementation; scalability in real operations

Table 1: Integration of Emerging Technologies in Military Cyber Defence

Effective integration therefore depends on building trustworthy, transparent, and human-centric systems. Ethical responsibility must guide every stage of innovation, from research and development to deployment in operational theatres.

Conclusion

Modern defence no longer takes place only on land, sea, or air, it also unfolds in the invisible domain of cyberspace. The military networks that support command, communication, and intelligence are now as critical to mission success as any weapon or vehicle. Protecting them requires not just technology, but awareness, cooperation, and trust.

This article has shown that true cyber resilience is built on three foundations: strong technical structures, educated and disciplined personnel, and continuous innovation. A secure network

[25] NATO Cooperative Cyber Defence Centre of Excellence (CCDCOE). Artificial Intelligence and Autonomy in the Military: An Overview of NATO Member States' Strategies and Deployment. Tallinn, 2021.

depends as much on human vigilance as on digital defence systems. Every soldier, officer, and analyst plays a role in keeping information safe and operations reliable. Technology will continue to evolve, bringing new opportunities but also new risks. Artificial intelligence, automation, and advanced encryption will help defend against attacks, but they must be used responsibly and remain under human control. The strength of any defence lies in how technology and people work together, not in machines alone.

Future success in cyberspace will depend on cooperation between allies and partners. Information sharing, joint training, and common standards will make collective defence stronger and more adaptable. The spirit of unity that defines military alliances must now extend fully into the digital domain. Cyber defence is not only about protecting data; it is about protecting people, missions, and the values they stand for. By combining innovation with discipline, and technology with human judgment, the military can ensure that every future operation, in both the physical and digital worlds, remains secure, effective, and guided by integrity.

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EMPLOYEE DEMOTIVATION BETWEEN THE PHENOMENON OF BOREOUT AND BURNOUT

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Abstract:
The study of this article started from the idea that the level of motivation of human resources is increasingly lower. The statement is justified by the increasing time spent by individuals at work, unrewarded activities or even by the lack of creativity, disinterest in the organization. Boreout and burnout are two current and common phenomena in organizations, regardless of the size or field of activity. Their accentuation can affect both individual and organizational performance, and there is the possibility of major dysfunctions. The main objective of this article is to show what are the causes of the appearance of these two phenomena in the organization, what are the consequences and how they manifest themselves depending on the generation from which the employees come.

Key words: demotivation, performance, human resources, burnout, boreout, generations

1. Introduction

We are increasingly witnessing an increase in the state of stress of human resources in organizations, whether we are talking about their field of activity, size or even their environment (civil or military). The causes or factors are diverse, from personal problems, from physical and mental exhaustion (burnout) to boredom syndrome at work (boreout). The human resource within organizations, whether civilian or military, is composed as normal, of almost all generational categories (Baby Boomers, Generation X, Generation Y – Millennials, Generation Z), which makes both knowledge, perceptions and resilience to stress or other factors of a negative nature different. The fact is that, for each generation, the degree of difficulty of the challenges is different.

Excessive fatigue but also boredom or routine at work also become elements that contribute to increasing the level of demotivation. In addition to these, another component can be added, stress that intensifies depending on the nature or severity of the situations. At the same time, demotivation can also be a cause that occurs as a result of an unrewarded effort that the human resource has identified, which can negatively affect both the relationship with superiors and colleagues but can also affect productivity. So, demotivation is a phenomenon whose components are related to the performance of the human resource and the quality of the professional activity.

In organizational settings, employees often begin their roles with only the requisite skills to perform at an acceptable level. As they gain experience and develop new competencies, the scope and complexity of their responsibilities may remain static. Over time, this lack of progression can result in decreased motivation, increased stress, and workplace boredom [1].

2. Boreout syndrome in organizations

It is certain that boreout syndrome is the opposite of burnout syndrome. Boreout syndrome has been present in organizations for many years, even though it has not received much attention. Boreout occurs among employees who are not sufficiently intellectually stimulated at work, who do not have enough tasks to perform, or who feel that what they do does not spark their interest.

There are also common causes of boredom at work, such as a lack of continuous challenge, routine and monotony, lack of recognition and feedback, lack of autonomy, an unsatisfactory work environment, lack of career prospects, and the overuse or underuse of skills.

In the book *Diagnosis Boreout: Why under-challenge at work makes you sick* (*Diagnose Boreout: Warum Unterforderung im Job krank macht*) authors Philippe Rothlin and Peter R. Werder say that approximately 15% of office employees are at risk of developing *boreout* - a condition characterized by chronic boredom and demotivation in the workplace. These individuals often feel underchallenged and disengaged, frequently resorting to pretending to work in order to appear productive. Having mentally withdrawn from their roles, they become resigned to a lack of meaningful engagement. *Boreout* represents the inverse of burnout; while burnout stems from excessive workload and stress, *boreout* arises from insufficient stimulation and underutilisation of skills. Its consequences are similarly detrimental, leading to decreased morale, reduced productivity, and negative impacts on organizational performance [2]. The term "out" is a combination of the two English words "bore" (boring) and "out" (out). The combination of the two results in the expression "out of boreness". Therefore, someone who suffers from "bore-out" is a certain type of "out of boreness". Of course, this does not mean that no longer being bored puts an end to boredom, and therefore variety and enthusiasm return. On the contrary, boredom becomes so intense that a new, much worse dimension opens up for the affected person. The two authors also propose a simple sketch that includes the boreout elements, exemplified and adapted in Fig. 1.. It can be seen that the two define the concept of boreout by an imbalance between the time spent at the office and the actual work done there.

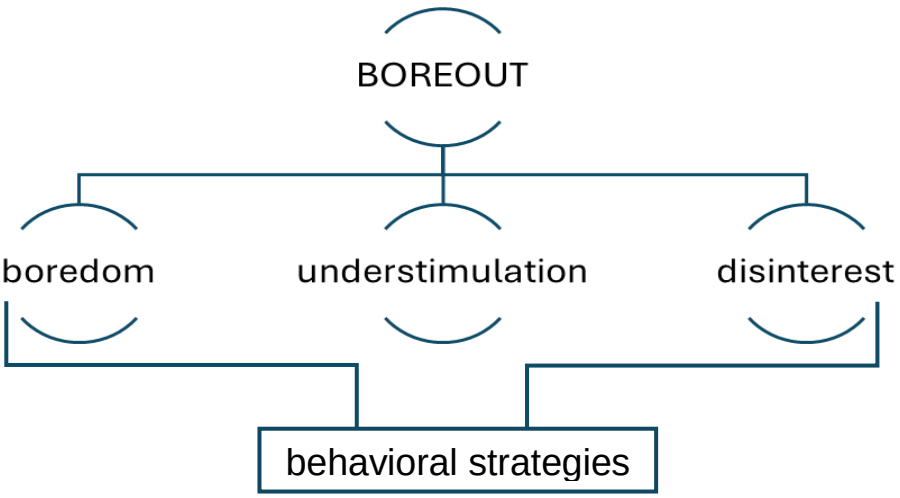

Fig.1 The three understimulation elements of the boreout concept
by Rothlin P. and Werder P. R.
(Source: adaptation after [2], p. 13)

Since this syndrome is understood as an absence from work, its psychological consequences do not cease to appear in various forms: from low self-esteem to shame (having the conviction of a person that he is not good enough or as good as his colleagues), from the feeling of guilt (receiving a salary without having achieved much or even nothing) to the lack of involvement and from here to the easy transition and to a general state of helplessness. Over time, these states listed above can also lead to the demotivation of human resources within organizations regardless of the generation they belong to.

Boredom is a psychological state characterized by a lack of interest, mental stimulation, or engagement with one's current activity or environment. Often described as a form of "mental idleness," boredom can occur across all age groups and contexts. It typically arises when individuals perceive their tasks or surroundings as monotonous, unchallenging, or lacking in meaning, leading to feelings of restlessness, diminished motivation, and apathy. Boreout is a psychological condition characterized by chronic boredom, particularly within the workplace. Unlike transient boredom, boreout carries a more insidious, existential dimension, emerging when individuals perceive their work as lacking purpose, significance, or meaningful engagement. This persistent sense of meaninglessness can lead to a profound sense of disengagement and demotivation. Similar to burnout and workaholism, boreout has been associated with adverse mental health outcomes, including increased risk of anxiety, depression, and other stress-related disorders, as evidenced by emerging empirical studies [3].

What many people don't know is that this situation ends up negatively affecting those who experience it. The lack of goals and the presence of disinterest in the work carried out soon give way to frustrations, causing long-term depression, apathy and concentration problems.

As a first conclusion, it can be said that boreout syndrome affects both the organization, by decreasing efficiency or even productivity, and the human resource, gradually turning into a demotivating factor.

3. Burnout syndrome in organizations

Burnout is a condition that arises from prolonged and persistent exposure to workplace stress, and is closely linked to psychosocial risk factors within the occupational environment.

The term burnout was first introduced by Herbert Freudenberger (1974) to describe a state of mental and physical exhaustion resulting from prolonged involvement in demanding work-related situations [4]. In recent years, the World Health Organization (2019) has defined burnout as an occupational phenomenon arising from chronic workplace stress that has not been successfully managed. It is characterized by three core dimensions: feelings of energy depletion or exhaustion, increased mental distance or negative attitudes toward one's job, and reduced professional efficacy [5]. Its official recognition took place gradually, the World Health Organization (WHO) included burnout in the International Classification of Diseases (ICD-11) as an "occupational phenomenon" in 2019, emphasizing that it is related to professional work, but is not a medical condition. This inclusion marked an important step in validating and standardizing burnout syndrome as a global mental health issue.

Work-related exhaustion is a psychological state experienced by employees, characterized by profound fatigue, impaired regulation of cognitive and emotional functions, and a marked sense of mental detachment from work-related activities [6].

If we refer to the current situation in Romania, whether we are talking about the public or private, civil or military domain, the burnout phenomenon seems to be increasing. This growth has

started to gain momentum especially since the pandemic period. The intensification started from the expectations that the human resource has and with the situations that it is willing to tolerate, then with the level or resilience to stress (insecurity at work, excessive work or failure to meet the deadlines for completing tasks, disruptive factors of any kind in the work environment, etc.). Without a doubt, the harmful effects of burnout lead to both a decrease in organizational productivity, affect personal relationships and health problems (in the long term most of the time). A series of studies are also being carried out in Romania on this burnout phenomenon with a visible negative impact on human resources. For example, a study conducted in 2024 by the APSAP Training Center highlights the increase in the number of employees affected by burnout (especially among women). This study also highlights the fact that 40% of employees who work shifts frequently experience professional burnout, among the main reasons that lead to physical and mental exhaustion are fatigue, overwork, unbalanced work schedule, repetitive work and lack of peace or privacy outside of work. A total of 2,053 employees (from the private and public sectors) participated in this study. As a conclusion, burnout is a real syndrome, with a considerable negative impact on employee performance, a fact that should not be ignored by managers, bosses, leaders [7]. In some European countries, burnout is recognized as a phenomenon associated with work, a result of occupational stress. In Romania, burnout is not yet considered a disease, but there are debates on the subject.

One of the reasons for excessive burnout at work is related to the constant involvement of the human resource. In the second quarter of this year (2025), Romania remains in first place in Europe in terms of employee engagement, with a percentage of 35%, despite a slight decrease of 1% compared to the previous year [8].

Another, much larger study was conducted this year (2025) by Gallup Global Workplace [9]. Gallup starts in this study from defining the concept of *employee engagement* by associating several components that can influence the accentuation of the burnout phenomenon that have been divided into three categories: *life evaluation* (thriving, suffering, struggling), *daily emotions* (daily stress, daily anger, daily sadness, daily loneliness) and *job market* (job climate, intent to leave). At the European level, Gallup conducted the study on 37 countries: Albania, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Kosovo, Latvia, Lithuania, Luxembourg, Malta, Montenegro, Netherlands, North Macedonia, Northern Cyprus (Territory of Republic of Cyprus), Norway, Poland, Portugal, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland.

In the following lines, some of these statistical data will be presented with reference to Europe in general and to Romania in particular. The top five and last five countries will be graphically represented with the corresponding values for each.

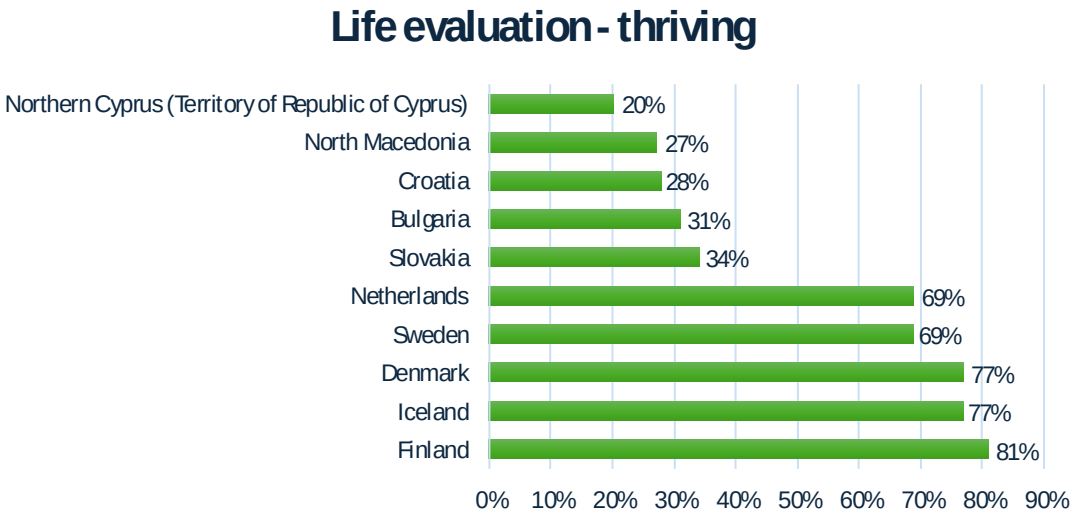

Fig.2 Life evaluation - thriving
(Source: author based on data collected from the Gallup 2025 Report, p. 103)

As can be seen in Fig. 2, of the 37 countries on which the study was conducted, the highest percentage in the *life evaluation – thriving* category was recorded by Finland with 81%, and the last place was Northern Cyprus (Territory of the Republic of Cyprus) with 20%. Romania is neither in the top 5 nor in the last five, but is in the 11th position with a percentage of 53%.

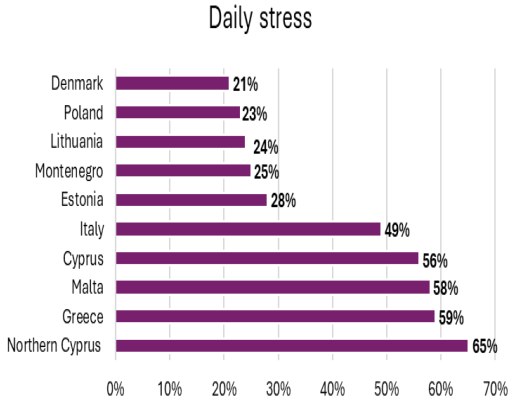

Fig.3 Daily emotions – stress

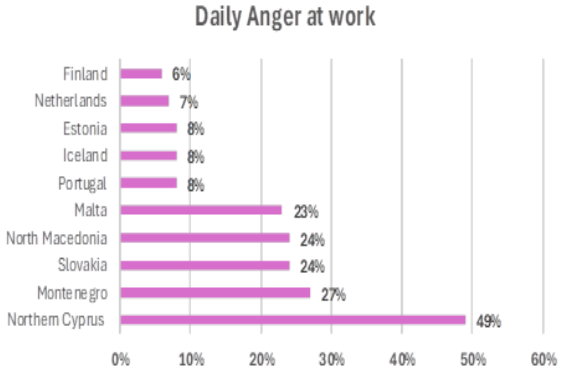

Fig.4 Daily emotions - anger
(Source: author based on data collected from the Gallup 2025 Report, pp. 104-105)

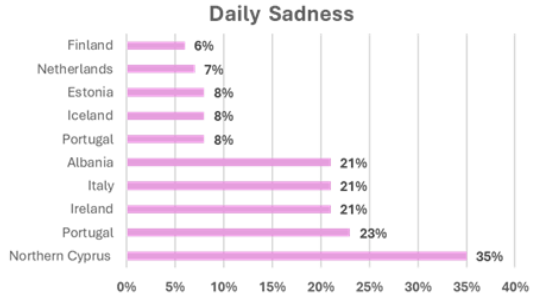

Fig.5 Daily emotions – sadness

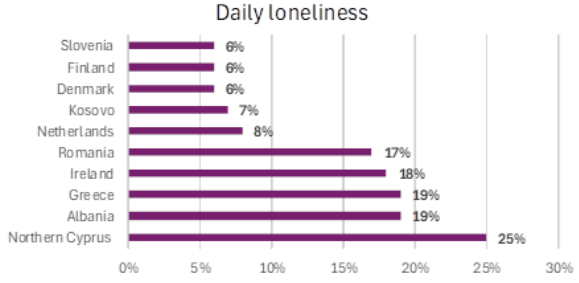

Fig.6 Daily emotions - loneliness
(Source: author based on data collected from the Gallup 2025 Report, pp. 106-107)

Fig.3, Fig.4, Fig.5 and Fig. 6 show the representative statistics for the second category of the study, Daily emotions. As mentioned before, this category included daily stress, daily anger, daily sadness, daily loneliness. In Fig.3, Daily emotions - stress, Northern Cyprus ranks first in terms of respondents' daily stress (21%), and Denmark ranks last (65%). Romania is in 20th place, somewhere below the middle position with a percentage of 37%. In Fig.4, Daily emotions - anger, Northern Cyprus is also in first place but this time with a percentage of 49%, Finland in last place with a percentage of 6%. In this category, Romania ranks 17th with a percentage of 15%. In Fig.5, Daily emotions - sadness, the highest percentage (so also on the 1st place) is also recorded by Northern Cyprus with 35%, and the last Kosovo with a percentage of only 4%, which means that the human resource is very relaxed during working hours. And here Romania is also in the middle of the ranking, more precisely on the 22nd place, by a percentage of 15%. In Fig.6, Daily emotions – loneliness, the 1st place in the ranking is also occupied by Northern Cyprus with a percentage of 25%, and the last place is occupied by Slovenia with a percentage of 6%. As can be seen, Romania is on the number 5 position, with a fairly successful percentage of 17%.

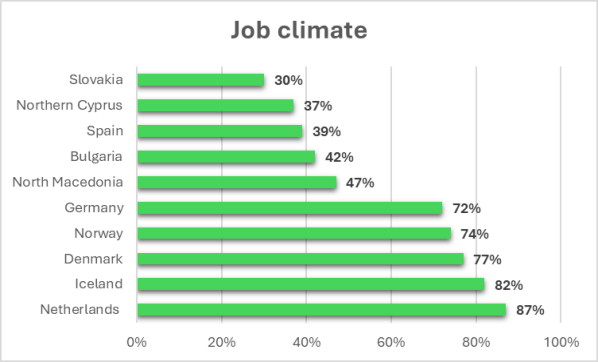

Fig.7 Job Market - job climate

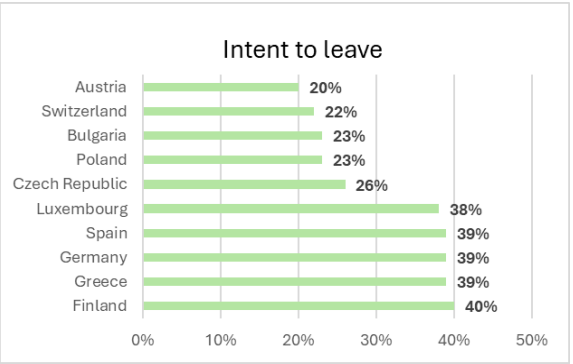

Fig.8 Job Market – intent to leave

(Source: author based on data collected from the Gallup 2025 Report, pp. 108-109)

In the last category of the study, Job Market, two subcategories were included, as can be seen in Fig.7 Job climate and Fig.8. Intent to leave. As for the organizational climate, the respondents' response depended on the opportunity to find a better job compared to the offer of jobs in their proximity. Thus, respondents in the Netherlands are in first place (87%) and are convinced that it would be a good time if they had to take this step for their professional future. Slovakia is in last place with 30%. In this subcategory, Romania ranks 26th with a percentage of 52%. In Fig.8 Job Market – intent to leave, the respondents were questioned about their willful action of looking for a job at the time of the study. Finland is here in first place with 40% and Austria in last place with 20%. Romania ranks 32nd with a percentage of 27%, which is a good thing compared to the staff turnover.

4. Conclusions

In conclusion, both burnout and boreout affect not only employee well-being but also have significant implications for organizations. Most of the time, both boreout and burnout are caused by organizations. Thus, the responsibility of organizations is to take the appropriate measures to prevent and solve burnout or boreout situations.

In order to reduce or eliminate the phenomena of boreout and bornout, it would be preferable for organizations both in Romania and in other countries to invest more in the leadership culture and managerial professional development and to support a healthy organizational climate and, moreover, to adapt it generationally. On the other hand, some long-term designed human resource retention strategies should be considered.

Both syndromes, boreout and burnout can be prevented by the human resource.

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CURRENT CHALLENGES IN LOGISTICS PLANNING

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Abstract:
Logistics planning faces significant challenges due to factors such as supply chain disruptions, rising costs, labour shortages, technological integration and sustainability and environmental impact, which can hinder efficiency and cost-effectiveness, requiring to adopt adaptive strategies and innovative solutions to navigate these obstacles successfully.

The key point for logistician is a good planning, however, in today's rapidly evolving business environment, logistics planners face numerous challenges that can significantly impact operational performance and customer satisfaction.

Keywords: *logistics; planning; challenges; geopolitics; supply chain; costs; sustainability***.**

The line between disorder and order lies in logistics…"– Sun Tzu

Introduction

In today's globalized and fast-paced world, logistics planning has become increasingly complex, facing numerous challenges that impact efficiency and cost-effectiveness. From unpredictable supply chain disruptions to the integration of new technologies and evolving customer demands, logistics professionals must navigate a dynamic landscape to ensure smooth operations. The rise of e-commerce, geopolitical tensions, and regulatory changes further complicate the task of delivering goods on time and within budget.

1. Logistics in civilian life

The logistics is not as simple as it used to be. Moving goods from one location to another quickly and without a lot of expanses is one from the main goals of logistics. Nowadays there are a lot of things to consider for the logisticians which make the logistics more complex. Furthermore, procurement of different types of goods, equipment etc. and calculate the price for live cycle and maintenance is a very big concern for logisticians all over world.

Logistics planning faces significant challenges due to factors such as supply chain disruptions, rising costs, labour shortages, technological integration and sustainability and environmental impact, which can hinder efficiency and cost-effectiveness, requiring to adopt adaptive strategies and innovative solutions to navigate these obstacles successfully.

The key point for logistician is a good planning, however, in today's rapidly evolving business environment, logistics planners face numerous challenges that can significantly impact operational performance and customer satisfaction. Some of the key challenges are as follows:

1.1 Supply Chain Disruptions:

- ❖ Natural disasters, geopolitical tensions, and health crises (like the COVID-19 pandemic) can disrupt supply chains, causing delays, shortages, and cost increases;
- ❖ Global events like trade wars or border closures can affect the flow of goods across countries.

Mitigation of Disruptions:

- ✓ Diversity Suppliers – Source from multiply regions and suppliers to avoid over-reliance;
- ✓ Improve supply chain visibility – use real-time tracking and predictive analytics to anticipate delays;
- ✓ Build resilient network – establish alternative routes and backup suppliers;
- ✓ Stock safety buffers – keep essential inventory reserves for critical disruption.

All resources should be focused on a fluent process of movement the goods to avoid rising of prices which in a long term will have negative influence on a final result.

1.2 Rising Costs:

- ❖ Transportation has a significant costs, rising fuel prices, along with regulatory changes (like carbon taxes) make managing costs more difficult.

Controlling rising costs:

- ✓ Optimise routes and loads – use logistics software for cost-efficient deliveries;
- ✓ Implement dynamic pricing – adjust pricing strategies based on demand fluctuations;
- ✓ Negotiate carrier contacts – partners with multiply logistics providers for competitive rates;
- ✓ Leverage automation – robotics in warehouses and automated inventory tracking reduce labour costs;

In addition increasing the percentage of automatization of storages may have positive effect on shortages of labour.

1.3 Labour Shortages:

- ❖ There's a shortage of skilled workers, such as truck drivers, warehouse staff, and supply chain planners, making it harder to maintain efficient operations.
- ❖ Additionally, warehouse and delivery workers face high turnover rates, leading to training and retention issues.

Mitigation of labour shortages:

- ✓ Improve working conditions – Offer better salary and other benefits;
- ✓ Improve level of working skills – invest in trainings.

The logistics industry is faced a workforce crisis, exacerbated by the Covid-19 pandemic, which has led to early retirements and a lack of new entrants into the field. This shortage affected various aspects of logistics, including transportation, warehousing, and customer service. Logistics planners had to find ways to attract and retain talent while implementing automation and technology to compensate for labour shortages. The challenge was to create a workforce that is not only capable but also adaptable to the evolving demands of the industry.

1.4 Technological Integration:

1.5 While technology offers solutions like automation, integrating new systems can be complex, costly, and time-consuming.

1.6 Cybersecurity concerns also arise as logistics companies increasingly rely on digital platforms and cloud-based solutions.

Integrating advance Technology:

- ✓ Implementing AI and machine Learning – Improve demand forecasting and warehouse automatization;
- ✓ Cybersecurity measures - Protect digital logistics system from cyber threads.

The rapid pace of technological change presents both opportunities and challenges in logistics planning. While innovations such as artificial intelligence (AI), the Internet of Things (IoT), and blockchain can enhance visibility, efficiency, and reliability in logistics operations, they also demand significant investment and expertise. Many organizations struggle to integrate new technologies into their existing systems, leading to an inefficiencies. Moreover, the fast-changing technological landscape means that logistics planners must continually update their skills and knowledge to leverage new tools effectively. The challenge lies in balancing the adoption of innovative solutions while ensuring that they align with overall business strategies and positive impact on environment.

2. Sustainability and Environmental Impact:

2.3 There's increasing pressure to reduce the environmental footprint of logistics operations, including the carbon footprint of transportation, packaging waste, and overall energy consumption.

2.4 Companies are exploring eco-friendly alternatives, but the implementation of sustainable practices often comes with higher upfront costs and operational complexities.

Achievement of sustainability goals:

- ✓ Use eco-friendly packaging – Reduce waste with recyclable materials;
- ✓ Optimize load capacity - Minimize empty truck space for fuel efficiency;

- ✓ Adopt renewable energy - Use solar-powered warehouses and electric trucks and equipment;
- ✓ Comply with green regulations – Stay ahead of sustainability laws to avoid penalties.

As environmental concerns gain prominence, logistics planners face increasing pressure to adopt sustainable practices. This includes minimizing carbon footprints, reducing waste, and optimizing resource utilization. Implementing green logistics strategies often requires significant changes in transportation methods, packaging, and inventory management. However, the challenge lies in achieving sustainability without compromising efficiency or increasing costs. Balancing economic viability with environmental responsibility is a complex task that requires innovative thinking and collaboration across the supply chain.

"My logisticians are a humourless lot … they know if my campaign fails, they are the first ones I will slay."
– Alexander the Great

3. Logistics in military

Advancements in technologies have revolutionized military logistics, improving efficiency and interoperability. Despite challenges in budget and standardization, focus lies in enhancing technological capabilities and sustainability, fostering multinational cooperation for resilient and adaptable logistics systems.

Recently, military logistics has undergone a significant transformation characterised by the introduction of advanced technologies. Drones and cyber technologies have revolutionised aspects such as surveillance, reconnaissance and resupply, resulting in improved operational mobility and shorter deployment times. Information technology is now at the heart of logistical operations, promoting effective management and facilitating the processing of real-time data

Another notable development is the increase in multinational co-operation. Given the complicated geopolitical scenario, a co-operative approach has become essential. This has led to greater standardisation and interoperability between the logistical units of different nations, which increases efficiency and strengthens the unity of defence strategies.

Despite progress, the sector faces numerous troubles and challenges. The integration of state-of-the-art technology is a particular challenge due to budget constraints and the complexity of modern systems. Defence budgets are often limited, leading to a dilemma between funding modernisation initiatives and covering operational costs. Furthermore life cycle of equipment if also a huge issue which require additional expenses

Differences in technologies and standards among deferent counties forces sometimes hinder effective multinational cooperation. The quest for a uniform standard in technology integration and operational procedures remains an ongoing endeavour.

Rapid technological progress also brings with it vulnerabilities, particularly in the area of cyber technologies, necessitating constant updates and robust security measures. In addition, the dynamic

geopolitical environment requires a flexible logistical framework capable of adapting to different crisis scenarios and aligning strategic objectives with wider security interests.

Furthermore, civilian field of logistics is in a close coordination with military logistics. For instance Transportation Company's involvement in a military movement makes a huge impact for the military units during the Reception, Staging and Onward movement (RSOM) phase of the operations.

4.1 Personal and equipment movement.

First of all most important is to know operation scenario to plan movement of personnel and equipment. To correctly provide Reception, Staging and Onward Movement (RSOM) process for the units is usually big challenge for logisticians. Changing the phases of operation causes rapid changes in entire process. This requires the ability and flexibility to accelerate flows by adding additional RSOM forces or reducing them if necessary.

4.2 Reception phase:

This phase includes preparing personnel and equipment for launch and establishing an appropriate staging area to ensure smooth reception.

Reception, or rather the reception process, is the conduct of operations having as a starting and the arrival points of deployed forces, equipment and support materials in a POD. The main effort of the reception process is given by the logisticians from those components of the land, air and sea forces that do not self-deploy, as well as the logisticians by the units of specific forces that self-deploy and are taken over by reception as single entities.

Military and non-military activities can take place in a port at the same time and they can compete for limited port capacity, which is an additional challenge for the logisticians.

As an example we can consider below mentioned case:

The military unit is deploying a peacekeeping unit to a foreign country. The first step involves logisticians in a time-consuming process of planning the receiving the convoys of trucks, ships, or aircraft carrying the military vehicles, equipment (such as weapons, medical supplies, food), and personnel. Furthermore, logisticians must have a ready plan for the reception process itself, such as plans for inventory verification and inspection of equipment. Logisticians also must be ready for Custom/import compliance and have all needed documentation on hand.

All above mentioned requires a correct planning of process, logisticians (movement component) are always in close coordination with a local authorities and private or governmental organizations representatives.

4.3 Staging phase:

Staging according to the agreed NATO definition is the process of temporarily stopping and organizing personnel and materials for their training in order to carry out the onward movement.

The deployment process begins with the arrival of staff, equipment and logistical support capabilities in the waiting/staging area (SA), where the main objective is to achieve the initial

operational capacity and ends with the start of the movement. The SA provides support, facilities and other services to support the units as they prepare to continue their movement.

Staging involves activities related to: arrival of the personnel and goods, distribution of materials in accordance with national and force logistical regulations, assembly, maintenance and functional checks of equipment to prepare for further movement.

This is a crucial part of logistics planning, especially in military or complex supply chain operations. Staging refers to preparing goods or equipment in a designated area before they are moved to their final destination.

4.4 Planning requires:

- **Space Utilization**: Adequate space must be allocated for each type of item, considering both size and priority.
- **Labelling & Categorization**: Proper labelling of items to avoid confusion.
- **Prioritization**: Items for urgent delivery should be staged separately and easily accessible.

Example of staging phase is as follows:
Once the equipment and supplies are received, they are moved to a staging area near the point of reception (e.g., a warehouse or open field near the airfield/seaport). This required from the logisticians have on hand the ready plans:

- **For Sorting and Segregation:** Items need to be grouped according to priority, function, and destination. For example, combat vehicles, medical supplies, and rations are separated into different sections to ensure swift identification and loading for onward transport.
- **For Inspection and Maintenance:** The vehicles and equipment undergo routine checks and minor repairs (e.g., topping off fuel, checking fluid levels, ensuring readiness for deployment).
- **For Packaging and Labelling:** For supplies that are perishable or sensitive (e.g., medical kits, food), they must be repacked and labelled appropriately for transport. This ensures the items are protected and easily identifiable.
- **For Transportation Readiness:** Vehicles are made ready for convoy movement. For example, fuel trucks are refuelled, and heavy equipment transporters are arranged for moving larger equipment.

In conclusion, the staging phase plays a crucial role in preparing resources and aligning them with the strategic goals of units. It serves as a foundational step, ensuring that all resources are effectively managed, optimized, positioned and ready for the next phase.

4.5 Onward movement phase:

Onward movement is the process of moving units, personnel and accompanying materiel from staging areas to the forward bases. It may be multimodal and require unit reassembly in the final destination. It is complete when the different elements reach the final destination.

Efficient onward movement requires good logistical planning and a balanced, integrated system of terminal transfer operations, movement control, and cargo transfer operations. The onward movement process encompasses logistic support and should include host nation support.

Logistics is one of the primary element in planning process to ensure the success of following elements.

a. Movement Control. Movement control is the planning, routing, scheduling and control of personnel and cargo movements along Lines of Communication.

b. Transportation Network Planning. It is essential that capacities and capabilities of the transportation network be balanced against the movement requirements so that congestion of nodes and routes is avoided. The use of the Transportation Network may require planning of necessary recovery and essential maintenance of the network. The size and type of logistic support planning during onward movement is mission tailored. Convoy Support Centres, when set up along the land Lines of Communication in the Area of Operation, should provide the required logistic support, such as recovery, repair and medical.

As an example of onward movement process we can consider follows:

After the staging process is complete, the logistics team coordinates the onward movement of equipment and personnel. For this it is necessary to have ready plans for:

- **Transportation:** The equipment and personnel are required to be moved by the most efficient and secure means, depending on the terrain and mission requirements. For example:
    - **Land Transport:** Heavy trucks or armoured vehicles are planned to be used to transport military equipment and supplies over land to the destination base or operating area.
    - **Air Transport:** In cases of urgency or where land transport is impractical, military aircraft (e.g., C-130, C-17 or helicopters) need to be ready for using to airlift critical supplies or personnel.
    - **Sea Transport:** If the deployment is to a coastal area, ships may be used for the onward movement of large, bulky equipment.
- **Routing and Timing:** The logistics team develops detailed transportation plans, taking into account the most efficient routes, the security situation (to avoid ambushes or delays), and the timing of transport. Convoys might be timed to move during hours of low visibility or in coordination with military security forces.

- **Final Destination:** To be ready for receiving the forces at the final destination (FOBs or designated peacekeeping areas) logisticians are required to have plans for the offloading of equipment and deployment of the personnel to their AOO.

As a result we can highlight that the planning stage for Reception, Staging, and Onward Movement (RSOM) process is a critical component of logistics planning in military operations. Effective planning of RSOM ensures that personnel, equipment, and supplies are accurately received, efficiently organized, and swiftly transported to their final destination.

Conclusion

In conclusion we can say that, nowadays logistics planning is faced with a myriad of challenges that require innovative solutions and strategic thinking. The complexities of globalization, the rapid pace of technological change, the demand for sustainability and labour shortages all contribute to a dynamic and often turbulent landscape. To thrive in this environment, logistics planners be flexible, involve new technologies and prioritize sustainability while navigating the complexities of a global marketplace. By addressing these challenges head-on, organizations can enhance their logistics planning processes, ultimately leading to improved efficiency and customer satisfaction.

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OPTIMIZING THE HUMAN ELEMENT - USING AI AND MACHINE LEARNING FOR TALENT MANAGEMENT AND FORCE READINESS IN DEFENSE

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Abstract
This paper investigates the transformative potential of Artificial Intelligence (AI) and Machine Learning (ML) in revolutionizing defense-sector talent management and force readiness. For decades, military organizations have operated on an industrial-age personnel model characterized by rigid career paths, seniority-based promotions, and aggregate readiness metrics. This legacy system is increasingly untenable in an era defined by multi-domain operations, cyber warfare, and a high-stakes "war for talent" against the private sector. We argue that AI/ML represents a paradigm shift from reactive personnel administration to predictive talent optimization. This paper analyzes the application of AI across the entire personnel lifecycle: from predictive recruitment and personalized adaptive training to dynamic career pathing and high-fidelity, individualized readiness tracking. It explores how ML models can identify high-potential recruits for specialized fields, create adaptive learning systems that optimize skill acquisition, and power "talent marketplaces" that align individual competencies with emerging strategic needs. Furthermore, we examine the use of AI in moving beyond static unit reports to a real-time, predictive model of force readiness, encompassing individual physical and cognitive well-being. The paper's expected conclusions are threefold. First, the adoption of AI in talent management is no longer optional but a strategic imperative for maintaining a competitive military advantage. Second, this transition enables a move to a human-centric force, where individual potential is maximized, leading to higher retention and more effective "super teams." Finally, this transformation is fraught with significant ethical and technical risks—including algorithmic bias, the "black box" problem, and new data vulnerabilities—that require the establishment of robust ethical guardrails and a "human-in-the-loop" governance framework.

Keywords: Talent Management, Force Readiness, Artificial Intelligence (AI), Machine Learning (ML), Human Resources (HR), Predictive Analytics, Defense, Military Personnel, Adaptive Learning, War for Talent

1. Introduction

In the 21st century, the decisive element in warfare is no longer the mass of armies but the cognitive and technical acuity of the individuals within them. The modern battlespace—a multi-domain contest spanning land, sea, air, space, and cyberspace—is defined by speed, data, and rapid adaptation. In this environment, the "human element" has become the military's most critical asset and its most significant strategic vulnerability. As the U.S. National Defense Strategy (2022) notes, the "creativity and talent of the American warfighter" is a core asymmetric advantage.

Yet, the systems that defense organizations use to recruit, train, manage, and deploy this talent remain largely artifacts of the industrial age. The current personnel paradigm is a "one-size-fits-all" bureaucratic process built on standardized testing, lock-step career ladders, "up-or-out" promotion policies, and subjective annual reviews. This system is slow, inefficient, and ill-equipped to identify, nurture, or retain the specialized, diverse talent required for information-age warfare.

"The competition for talent is a global one, and it is a national security risk. We are in a 'war for talent' against the private sector and against strategic competitors. The DoD's industrial-age personnel system is a significant disadvantage in this competition." (Paraphrased from various DoD and NSCAI reports)

This paper argues that the integration of Artificial Intelligence (AI) and Machine Learning (ML) offers a revolutionary solution to this strategic mismatch. It enables a fundamental shift from a model of personnel administration to one of predictive talent optimization. By leveraging data, AI/ML systems can provide a high-fidelity understanding of every individual in the force, allowing defense leaders to optimize recruitment, personalize training, custom-tailor career paths, and predict force readiness with unprecedented accuracy. This is not a simple automation of existing HR processes; it is a complete re-imagining of how a military force understands, cultivates, and deploys its human element.

Also my paper will proceed in five parts. Section 2 will contrast the legacy industrial-age personnel model with the demands of the modern "war for talent." Section 3 will form the core of the analysis, exploring the "AI engine of talent management" across the personnel lifecycle, from recruitment and training to dynamic career pathing. Section 4 will analyze how AI/ML can be used to build a new, predictive model of force readiness. Section 5 will critically examine the profound ethical challenges, data risks, and governance problems inherent in this AI-driven approach. The paper will conclude that while the path is complex, the military that successfully masters AI-driven talent management will gain a decisive and enduring strategic advantage.

2.The Industrial-Age System in an Information-Age Conflict

The foundational personnel architecture of most Western militaries was designed in the 20th century to manage a large, homogenous, conscript-based force. Its primary virtues were administrative efficiency, standardization, and interchangeability. This legacy model is defined by several key, and now problematic, features.

First, its talent identification is crude. Recruitment relies heavily on broad aptitude tests (like the ASVAB in the U.S.) that are poor predictors of success in high-demand, specialized fields like cyber operations, data science, or psychological operations. They test for general knowledge, not latent potential or niche skills.

Second, its career development is rigid. Personnel are funneled into siloed career fields (e.g., infantry, logistics, intelligence) with little opportunity for cross-functional movement. Promotion is tied more to "time-in-grade" and seniority than to demonstrated skill or potential, creating a system that often frustrates and alienates high-performers (RAND Corporation, 2019). This "up-or-out" policy forces talented specialists to either become managers (a role they may not want or be suited for) or leave the service.

Third, its retention model is reactive. The military often does not know why its best and brightest are leaving until the exit interview, by which point it is too late. It lacks the tools to predict attrition risks for high-value individuals and intervene with targeted incentives.

Finally, its readiness model is aggregate and subjective. A unit commander reports their readiness (e.g., a "C-1" or "C-2" rating) based on broad categories of personnel, equipment, and training. This "snapshot" report is often out-of-date by the time it reaches senior leaders and fails to capture the granular, individual-level data that truly defines a unit's combat effectiveness.

This industrial-age system now faces an existential crisis: the "war for talent." A skilled data scientist, cyber operator, or AI engineer is now as valuable to national defense as a fighter pilot. These individuals, however, are not motivated by traditional military career paths. They are "digital

natives" who expect dynamic careers, continuous learning, and merit-based advancement. They are being aggressively recruited by a private sector that offers higher salaries and more flexible work environments. As the U.S. National Security Commission on AI (NSCAI) report (2021) bluntly stated:

> "The U.S. government is not prepared to defend the United States in the coming AI era... the government is not organizing to win the technology competition... A core part of 'winning' is first winning the competition for human talent."

3. The Industrial - Age System in an Information-Age Conflict

An AI-driven talent management system offers a data-rich, personalized, and predictive alternative to the legacy model. It reframes the "human element" not as a set of inventory to be managed, but as a portfolio of capabilities to be cultivated.

3.1 Predictive Recruitment - Finding the "Needle in the Haystack"

The challenge is not just finding more recruits, but finding the right recruits. ML models can revolutionize this process by moving beyond standardized scores. This is a "Moneyball" approach to recruiting (Laird, 2020). By analyzing vast, anonymized datasets—encompassing demographic, educational, psychometric, and even publicly available online data (like coding contributions on GitHub)—an AI can build "success profiles" for mission-critical roles.

For example, an ML model could identify the subtle, non-obvious traits that correlate with a highly successful intelligence analyst or cyber operator. This allows recruiters to focus their efforts on high-potential candidates who might have been overlooked by traditional screening. This also allows for the "personalization" of the recruiting pitch itself, with AI-driven systems tailoring outreach to resonate with a specific individual's likely motivators (e.g., service, technical challenge, educational benefits). A 2020 report from the U.S. Army Research Institute highlighted the potential for ML to identify "new-to-the-Army" talent pools, expanding the recruiting base beyond its traditional demographics (U.S. Army, 2020).

a. Personalized Training and Education

The "one-size-fits-all" classroom model is a relic. AI enables a shift to Adaptive Learning Systems (ALS) that function as personal digital tutors. An ALS, often developed from programs initiated by agencies like DARPA, can assess a soldier's knowledge base and learning style in real-time, then dynamically adjust the curriculum (DARPA, 2019). If a soldier is struggling with a concept, the AI provides remedial exercises; if they are excelling, it accelerates them to more advanced material.

This is particularly transformative for highly technical fields. Instead of a 52-week training pipeline where all students move at the same speed, an ALS could allow a gifted cyber trainee to graduate in 30 weeks, while providing the necessary 60 weeks for another who struggles but shows high potential. Furthermore, AI-driven synthetic training environments (STE) can create hyper-realistic, adaptive scenarios where soldiers and teams can train against an "AI opponent" that learns and adapts to their tactics, dramatically increasing the quality and cognitive load of training.

3.3 Dynamic Career Pathing & Predictive Retention

Perhaps the most revolutionary application of AI is in "career-pathing." The rigid, linear career ladder is replaced by an AI-powered "talent marketplace." The U.S. Army has already begun implementing this with its "Army Talent Alignment Process" (ATAP).

This system functions like an internal LinkedIn, actively managing the careers of all personnel. An AI "career advisor" would analyze a soldier's complete profile—their skills, performance reviews, preferences, and even "latent" skills identified by the system—and match them with opportunities. It might recommend a specific assignment, a new skill certification, or an advanced degree, all designed to optimize that individual's potential while simultaneously filling a critical need for the force.

"Instead of just 'filling billets,' a talent marketplace actively matches the 'supply' of individual officer talents with the 'demand' of unit requirements, using market-based principles and data-driven insights. It empowers individuals to have a say in their own career, increasing engagement and retention." (U.S. Army, 2021)

This system's data-rich environment also powers predictive retention. By analyzing patterns in performance, assignment history, pay, and even sentiment, an ML model can identify high-value personnel who are at high risk of leaving the service *before* they make the decision. This "early warning" allows leaders and HR managers to intervene with targeted incentives, whether it's a bonus, a stabilization offer, a more challenging assignment, or an opportunity for family care. This is a surgical, data-driven approach to retaining the talent that matters most.

4. AI-Driven Force Readiness - A Real-Time Dashboard

The ultimate goal of talent management is force readiness. AI allows commanders to move from subjective, aggregate reports to a granular, predictive, real-time understanding of their force.

4.1 From Aggregate to Individual Readiness

A future readiness dashboard, powered by AI, would pull real-time data from hundreds of sources for every individual in a unit. It would track:

- Medical Status: Data from health records and even personal wearables (e.g., sleep patterns, heart rate variability).
- Training Status: Automatic logging of all completed training, certifications, and "skill decay" (i.e., when a certification needs refreshing).
- Equipment: Status of all individually assigned weapons and gear.
- Psychological Readiness: Non-intrusive sentiment analysis or app-based check-ins to monitor stress, morale, and cognitive load.

An AI would analyze this data to provide a commander with a simple, visual dashboard: "This squad is at 90% combat effectiveness, but Specialist Smith is at 60% due to poor sleep and an expired medical cert, and Sergeant Jones's team is at 75% because their advanced cyber training is 18 months old." This allows for immediate, targeted interventions.

4.2. Predictive Health and Wellness

The military's greatest non-combat cost is often injury. Musculoskeletal injuries, in particular, sideline thousands of soldiers. ML models, fed with data from wearables and physical training logs, can build predictive models of injury. The system could "red flag" a soldier who is over-training or showing biometric signs of an impending stress fracture, allowing for preventative intervention (Van Duren, 2023).

This extends to mental health. By analyzing communication patterns (in anonymized contexts), sleep data, and self-reported stress levels, an AI can identify individuals at high risk for burnout, PTSD, or other mental health crises. This allows chaplains, medics, and leaders to provide support *before* a crisis occurs, preserving the force and saving lives.

4.3. Optimal Team Composition

Perhaps the most "sci-fi" but operationally critical application is AI-driven team building. A commander has a mission; the AI can help assemble the optimal team to execute it. Going beyond simple skill checklists, the AI could model "super teams" based on complementary skills, cognitive diversity, and even personality compatibility that has been shown to lead to high performance (Weitz, 2022). For a complex cyber-mission, the AI might recommend *not* picking the five best coders, but instead picking three coders, one creative problem-solver, and one highly-structured project manager, as their combined cognitive "fingerprint" is a better match for the mission profile.

5. The "Black Box" in the Barracks - Risks and Ethical Guardrails

This AI-driven future is not a utopia. Its implementation is fraught with profound risks that must be managed to avoid creating a system that is more efficient but less fair, just, and resilient.

5.1 The Scourge of Algorithmic Bias

The most significant risk is bias. AI models are trained on historical data. If that historical data reflects decades of systemic bias—in promotions, assignments, or disciplinary actions against women or minorities—the AI will not only *learn* this bias, it will *amplify* and *institutionalize* it at scale.

"An algorithm is not a neutral arbiter. It is an opinion, embedded in code, reflecting the values and biases of its creators and the data it was fed. An AI trained on a biased past will create a biased future." (O'Neil, 2016)

If an AI learns that "leaders" (based on 30 years of data) are predominantly white males from specific universities, it will "correct" for diversity by flagging candidates who do not fit that profile. This creates a "bias-laundering" system where discriminatory outcomes are masked by the false objectivity of a machine. Mitigating this requires rigorous bias audits, an active "human-in-the-loop" to override flawed recommendations, and the use of explainable AI (XAI).

5.2 The "Black Box" Problem and Explainability (XAI)

How does a commander justify denying a soldier a promotion, or sending one unit instead of another, if the recommendation came from an unexplainable "black box" algorithm? This is the central challenge of XAI. For an AI to be trusted in high-stakes human decisions, it must be able to "show its work." A leader *must* be able to query the system and get a human-readable answer: "Specialist Smith was recommended for promotion because she scored in the 95th percentile on skill X, showed 80% positive team sentiment, and has a latent skill in Y that is a 90% match for the new role." Without this explainability, trust in the system—and in leadership—will collapse (Gunning & Aha, 2019).

5.3. Data Vulnerability and Adversarial Attacks

Centralizing the entire personnel, medical, and psychological profile of every member of the armed forces into one data ecosystem creates the single most valuable intelligence target imaginable for an adversary. A foreign power that could hack this system would gain a complete "order of battle" of the military's human element.

Worse, they could conduct "data poisoning" attacks, subtly manipulating the training data to cause the AI to make catastrophic errors. They could, for example, feed the system false data to ensure that high-potential, diverse candidates are overlooked for promotions, or that soldiers with specific vulnerabilities are assigned to critical roles. The "digital file" of a soldier becomes a new attack surface.

6. Conclusion

The integration of AI and ML into defense talent management is not a question of if, but when and how. The industrial-age personnel system is broken, and it is failing to prepare the force for the cognitive and technical demands of 21st-century conflict. The "war for talent" is a precursor to any future war, and it is one that cannot be won with legacy systems.

This paper has argued that AI offers a path to a truly optimized human element. It enables a personalized, predictive, and data-driven system that can identify the right talent, train it to mastery, and manage its career in a way that maximizes both individual potential and organizational need. It allows commanders to build a predictive, high-fidelity model of force readiness that treats soldiers as individuals, not as interchangeable parts.

However, this transition is a "dual-use" technology. The same tools that optimize the force can also institutionalize bias and create catastrophic new vulnerabilities. The solution is not to reject the technology, but to embrace it with clear-eyed, human-centric governance. The "human-in-the-loop" cannot be an afterthought; it must be the central design principle. An AI can recommend, but a human commander must decide. The AI's job is to illuminate the data, reveal hidden patterns, and provide options; the commander's job is to exercise judgment, wisdom, and ethical leadership.

The military that masters this synthesis—blending the predictive power of AI with the judgment and moral courage of its human leaders—will not only win the war for talent. It will have built a force that is more lethal, more resilient, and more ready for the complex challenges ahead..

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NON-ECONOMIC AND ECONOMIC BENEFITS IN DEFENSE

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Introduction

It is estimated that a large portion of the country's state budget is allocated to the defense sector, which includes armament, equipment, maintenance, and development of the armed forces, as well as training troops and ensuring security. These expenditures can be even greater if external threats threaten the country's security or if the country needs to strengthen its defense system.

In order to facilitate national defense, the defense sector plays a critical function in fostering stability and security within the country, which, in itself, prevents any potential wars or internal tensions that would otherwise adversely affect the economy. From a budgetary perspective, each dollar spent by the military is one that will not be spent on other public resources. Though the military itself does not manufacture material commodities, a secure environment aids in promoting economic growth by attracting investors and ensuring normal trade. This, in turn, contributes an impressive part to the economy, both economically and non-economically.

Keywords:benefits,;, defense; economy; industry; innovation.

1. Economic Benefits

1.1 Job Creation

The defense industry offers a lot of employment, both direct (in the armed forces) and indirect (in supporting industries). They range from military officers, commanders, and experts (electronics, engineering, technology, communications, and medicine) to teachers (in military academies) and even consulting and managerial jobs.

Additionally, the growth of the defense system generates operational demands for the defense industry and infrastructure, which enable the generation of new private sector jobs, for example, in the defense-industrial complex as well as in firms supplying the Ministry of Defense with a range of services and products.

In the past five years, the Republic of Armenia has been actively pursuing a policy aimed at promoting the technological development of domestic research institutes and companies involved in the design and production of armament and military equipment. This, in turn, leads to significant financial investments in this sector and the creation of jobs with various specializations. Thus, alongside the growing interest in the defense industry at the state level, highly qualified specialists are being engaged in local companies.

1.2 Development of Local Production

The local defense industry promotes the development of defense-industrial technologies, which reduces dependence on external suppliers. In turn, the development of the local defense industry can lead to an increase in exports, as defense products and components are often in demand in other countries. The growth in exports increases the flow of foreign currency into the country, which can improve the country's trade balance and economic stability. This source can be significant for the economy in countries with high demand for military products. The government can support local defense companies by providing various tax incentives and export promotion programs.

The growth in defense industry volumes can also increase state revenues, especially if the sector is under state control. This can lead to higher tax revenues, which should be directed towards the development of the public sector, such as education, healthcare, infrastructure, and more.

The defense industry can also have a positive impact on local small and medium-sized enterprises that support the defense sector with their products. Smaller producers can create subcomponents, materials, or services required by the defense sector, helping them expand their production capabilities and enter new markets.

Armenia has various defense-related productions, including the production of unmanned aerial vehicles (UAVs). For example, Armenian UAVs such as Krunk, Aragil, Bzez, and Garun-1 are achievements of the Armenian defense industry. Technological companies collaborating with the Ministry of Defense are also developing military electronics, software, and artificial intelligence (AI) solutions, which could later be used in civilian sectors as well.

1.3 Technological Innovations and Civil Applications

R&D (Research & Development) programs implemented in the defense sector often have dual-use significance, meaning that military technologies are later applied in civilian sectors. Below are several well-known examples of technologies that were initially developed exclusively for military purposes but later became an integral part of civilian life.

For a more recent example, consider that we now have drones capable of taking wedding photos and potentially delivering packages. Much of the expense of creating basic drone technology was driven by military spending.

The Internet was originally created in the 1960s and 70s by the U.S. Department of Defense as ARPANET (Advanced Research Projects Agency Network) for data exchange between various military institutions.

GPS (Global Positioning System) was initially developed by the U.S. military for military purposes, such as accurate location tracking for civilian flights, navigation, aircraft, and ammunition.

The microwave oven was originally developed during World War II for quick food preparation and temperature control for soldiers.

The Chinese company Huawei began as a producer of military communication and telecommunication technologies. However, it later became one of the largest and most well-known manufacturers of mobile devices, also playing a significant role in the civilian telecommunications market. The company produces mobile phones, smart panels, computers, and other civilian technological devices.

The Hummer was originally created for the U.S. military as a specially designed mobile and environment-resistant assault vehicle, first introduced in the 1980s as the HMMWV (High Mobility Multipurpose Wheeled Vehicle). In the 1990s, General Motors (GM) began producing civilian versions of the Hummer, making it more luxurious, powerful, and comfortable. The Gelandewagen also followed a similar path.

Some technologies developed for defense purposes in Armenia have later been applied in the civilian sector, contributing to the country's technological progress and economic development. Here are some examples:

Unmanned Aerial Vehicles (UAVs)

The development of UAVs in Armenia began based on defense needs. However, over time, these technologies found applications in the civilian sector, such as:

1. Agriculture: UAVs are used for field monitoring, crop condition assessment, and pest detection.

2. Construction and Mining: UAVs are used for mapping areas, monitoring construction work, and exploring mining sites.
3. Emergency Management: UAVs are used for area reconnaissance during disasters, planning rescue operations, and monitoring situations.

Cybersecurity Solutions

In parallel with the development of information technologies in the defense sector, cybersecurity solutions have been developed in Armenia, which were later applied in the civilian sector to ensure data protection and system security.

Radio Communication and Telecommunication Technologies

Some radio communication and telecommunication technologies created for military purposes have been adapted for civilian use, including in emergency management, telecommunications, and other fields.

These examples demonstrate that investments and developments in the defense sector can have broad applications in civilian life, contributing to the overall progress of the country.

1.4 Investments, Exports, and International Cooperation

Investments, exports, and international cooperation in the defense sector are interconnected processes that complement each other and strengthen the country's economic, technological, and strategic positions. Investments in the defense sector can be both public and private. For example, many technology giants from Silicon Valley (such as Google and Microsoft) received their first investments from Pentagon (DARPA) projects. Investments (both public and private) provide the technologies, infrastructure, and workforce necessary for production. When defense-industrial investments are made, the capabilities of local companies to create exportable products increase. The establishment of factories and research centers allows products to enter international markets.

Exports generate economic profit, which is reinvested into new investments. Revenues allow companies to make new investments by modernizing production and developing new technologies. Funds from exports contribute to the opening of new factories, retraining specialists, and financing research programs. In the case of successful exports, investors are more willing to finance the further development of the defense industry.

International cooperation facilitates investments and expands export markets with various countries. It can lead to foreign investment attraction, while defense contracts with strategic allies ensure export markets and joint development of high technologies and exchange of expertise help countries compete in the international market.

For example, South Korea collaborates with the U.S. in the field of defense technologies, resulting in U.S. investments in South Korean military companies, while South Korea exports its military products. Armenia and India cooperate in the development of military technologies, which will allow for attracting investments and later exporting.

2.5 Promotion of Infrastructure Development

The development of the defense industry requires new production infrastructure, including new factories, equipment, and high-tech production facilities. The latest technologies used in the defense industry (such as automation, complex equipment, and robots) are often transformed for use in civilian sectors, contributing to the development of civilian infrastructure. For example, developments in robotics or information technologies, which are based on military sector technologies, can also be widely adopted in other economic sectors, from healthcare to engineering.

The transportation of defense-industrial products requires improved transportation infrastructure, such as more developed roads, railways, airports, and seaports. These infrastructures, created for military and logistics purposes, are often expanded for use in civilian industries, providing more efficient transportation of goods. Moreover, these infrastructures can also accelerate activities in other economic sectors, such as tourism, trade, or humanitarian aid.

The defense industry often requires advanced logistics and supply networks designed for the transportation of large volumes of goods. These networks, consisting of distribution, storage, transportation, and servicing infrastructure, can serve not only military but also civilian sectors, enabling the creation of more efficient connections between producers and consumers, and improving market dynamics.

Information technologies, big data processing, and telecommunication systems for military purposes are constantly being improved, as they are essential for the proper functioning of military systems. Later, such advanced infrastructures can be widely applied in the civilian sector, allowing for the development of more efficient and secure connections for all types of businesses and public services (e.g., mobile communication).

However, there may be serious doubts about many of these claimed economic benefits. For economists, a major concern arises over the alternative-use value of the resources employed in the armed forces and national defense industries. It needs to be asked whether the resources used in the military-industrial complex would make a greater contribution to jobs, technology, spin-offs, and exports if these resources were used elsewhere in the economy.

2. Non-Economic Benefits

Defense spending also contributes major non-economic benefits to a nation, and it might be that the non-economic benefits are valued more highly than the economic benefits. Non-economic benefits do not contribute to national output. They comprise political, military-strategic, and international benefits. These include the ability to pursue national interests and foreign policy objectives; adding to a country's international reputation, standing, and status in the world (the feel-good factor); and its position in the world power hierarchy. These non-economic benefits might be reflected in a nation's position in the United Nations (e.g., membership in the Security Council), its membership in world economic organizations (e.g., OECD, IMF, G-8, and G-20 groups of nations), its leadership positions in international military alliances (e.g., NATO), and its ability to influence the behavior of other nations. There are military-strategic benefits from bilateral or multilateral military alliances (e.g., benefits from standardization of equipment and tactics; some of these benefits are economic in the form of cost savings). A nation can obtain further non-economic benefits in the form of prestige and international reputation by providing military forces for international peacekeeping and peace enforcement, leading to world peace. However such peacekeeping contributions are not costless. Further non-economic benefits arise where a nation's armed forces contribute to international efforts on humanitarian aid and disaster relief: these contributions provide a "feel good" factor for the contributing nation's citizens.

The non-economic benefits of the defense sector impact national security, international relations, scientific and technological progress, as well as the social stability of society.

2.1 National Security and Stability

The primary purpose of defense spending is to protect national security and state sovereignty, which are the main prerequisites for stable economic development. Strong defense capabilities prevent external aggressions and ensure the territorial integrity of the country.

1. The presence of defense forces prevents external aggression and strategic threats.
2. The military and law enforcement agencies play a crucial role in ensuring internal security by combating terrorism, illegal arms trafficking, and uprisings.
3. The effective functioning of the armed forces is especially important for countries facing geopolitical threats.

A high level of security reduces social tension, improving the quality of life for the population. As an example, Israel's Iron Dome missile defense system has played an important role in maintaining societal security and political stability by neutralizing the threat of missile attacks.

2.2 Impact on International Politics

Military power is not only a tool for security but also for diplomatic influence for countries. Military power increases a state's diplomatic weight in international relations. Arms exports and defense cooperation contribute to the formation of strategic partnerships, which enhance the country's position on the international stage.

1. Defense capabilities allow states to become active players in international politics.
2. Arms exports and defense cooperation can form strategic partnerships.
3. Countries with high military capabilities increase their influence in international negotiations.

The military power of the United Kingdom and France allows them to play an influential role in the United Nations Security Council. NATO member countries have greater influence on global politics through their collective military capabilities, determining security priorities.

2.3 Scientific and Technological Development

The defense industry stimulates the development of science and technology, which also impacts the civilian sector. The process of developing defense technologies promotes the advancement of scientific and engineering research, leading to innovations and technological growth.

1. Defense research often results in technological innovations in the civilian sector (spillover effects).
2. Defense research encourages the spread of innovations across various sectors.
3. Defense programs promote the growth of scientific and engineering education, which, in turn, enhances the role of scientific institutions.

2.4 Improvement of Education and Workforce Quality

The development of the defense sector requires highly qualified specialists, which promotes improvements in the educational system. Additionally, military service contributes to strengthening patriotism and national identity.

1. The development of military technologies requires high-tech knowledge, which boosts engineering education.
2. Military training enhances human capital development.
3. The defense industry creates jobs in high-tech sectors.
4. The demand from the defense sector contributes to the growth of engineering, scientific, and technological education.

5. The knowledge gained from the military sector can be applied in other strategic fields, such as medicine, energy, and information technologies.

2.5 Strengthening of Crisis Management

Defense forces have not only military but also rescue and emergency management functions.

The military played a crucial role in the rescue and recovery efforts following the Spitak earthquake that struck Armenia on December 7, 1988—the most devastating natural disaster in the region, causing widespread destruction and loss of life. Some of the key contributions of the military during this time included search and rescue operations, logistical support, medical assistance, establishing temporary shelters, maintaining order and security, recovery, and reconstruction.

Another example is how the U.S. military used its logistical resources during the COVID-19 pandemic to build hospitals and distribute vaccines.

The military plays a crucial role in peacekeeping and humanitarian missions. Armenia has also been involved in several peacekeeping operations and humanitarian missions, contributing to international stability and demonstrating its commitment to global security, despite not being a member of NATO. Armenia's peacekeeping efforts have mostly been focused on areas like Afghanistan, Kosovo, Syria, Mali, and Lebanon.

1. Defense technologies can be used for civil protection.
2. Military technologies and infrastructure can be used for civilian needs.

Conclusion

In conclusion, defense investments provide a combination of economic and non-economic benefits that contribute to national security, stability, and development. Economically, defense spending generates employment opportunities in various sectors, from manufacturing to research and development, stimulating both local and national economies. It also fosters technological innovation, with advancements in aerospace, cybersecurity, and artificial intelligence often leading to commercial applications that drive broader economic growth. Additionally, a strong defense sector attracts foreign investments and strengthens industrial supply chains, enhancing a nation's global competitiveness.

Beryond economic factors, the non-economic benefits of defense are equally significant. A well-funded and strategically managed defense system ensures national sovereignty by deterring potential threats and safeguarding territorial integrity. It also plays a crucial role in maintaining international peace and stability, allowing for diplomatic influence and strategic alliances. Moreover, national defense fosters public confidence, as citizens feel secure in their daily lives, which contributes to social cohesion and overall well-being. Ultimately, a balanced approach to defense investment is necessary, ensuring that economic growth and security needs are met without compromising other vital sectors. By leveraging both economic and non-economic benefits, a country can build a resilient and prosperous society while maintaining a strong national defense.

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