

**Personnel policy and defence economics:
The relationship between efficiency and costs in the armed forces**

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Abstract. The purpose of this study was to examine the impact of human resources policy on the economic efficiency of the armed forces, with a focus on cost optimisation and combat readiness. The study analysed human resource management models, including contract recruitment, long-term workforce planning, short-term training programmes and rotation, and their impact on economic performance in the armed forces of countries such as the United States, the United Kingdom, Germany, Sweden, Canada, Australia, Israel, France, Italy, Spain, India, Romania, Pakistan, Norway, and Ukraine. Furthermore, a comparative analysis of the defence sector of these countries was conducted, with a special focus on the personnel policy of the Ukrainian defence sector. The study also conducted a SWOT-analysis of these models, which helped to assess their strengths and weaknesses, opportunities and threats to the economic efficiency of the defence sector. Specifically, contract recruitment provides flexibility in staffing levels but can lead to low staff loyalty, while long-term workforce planning promotes stability but requires significant investment. The findings showed that effective career planning, exacting standards of recruitment, regular training, and social support are key factors that contribute to cost optimisation and staff stability. Furthermore, the integration of technological training improves resource efficiency and reduces maintenance costs. The SWOT analysis demonstrated that a hybrid model that combines elements of different approaches ensures adaptability in crisis situations but requires careful management due to the heterogeneity of the workforce. Based on the findings, the study offered recommendations for optimising human resources policy to increase the cost-effectiveness of the armed forces, particularly through flexible recruitment programmes, the use of civilian specialists for non-critical positions, and the integration of reservists to perform support tasks in crisis conditions, with a detailed analysis of their implementation in the Ukrainian defence sector. The findings confirm that a balanced human resources policy allows maintaining combat readiness while reducing overall defence sector costs

Keywords: military resources; national security; personnel management in the army; security sector; army financing

Introduction

Changes in the global security environment, driven by intensifying geopolitical conflicts, rising military budgets, and technological advancement, make the defence sector a critical element of national security. Therewith, governments are increasingly faced with the need to manage resources efficiently to ensure that their armed forces are as effective as possible within limited financial means. The issue of optimum personnel policy has become one of the central aspects of the economic efficiency of military structures.

Integrating the principles of economic management into the personnel policy of the armed forces allows striking a balance between costs and the effectiveness of military operations. At the same time, considering the unique needs of the defence sector, the study of mechanisms that contribute to both cost reduction and efficiency improvement becomes necessary for the development of modern defence management strategies.

Human resources policy and economic management are vital elements that influence the functionality and effectiveness of the armed forces (Gavrysh *et al.*, 2024). With limited resources, effective personnel management is crucial for maintaining defence capabilities.

D. Clarke (2021) emphasised the significance of civil-military relations and their effect on personnel decisions in the defence sector. The researcher noted that coordination between civilian and military leaders contributes to the optimum allocation of resources, especially in recruitment and training. This ensures a more stable and predictable personnel policy in the face of uncertainty. N. Malik (2024) explored the political economy of the defence sector in the case of Pakistan. The researcher highlighted the role of a strategic approach to education and training of military personnel, which affects the optimisation of costs

in the sector. N. Malik emphasised that priority funding of military educational institutions can reduce the cost of supplementary education and training.

J.M. Ortiz-Villajos & J.J. Martos-Gómez (2023) analysed the modernisation of the Spanish armed forces, focusing on the economic aspects of defence. Their study found that careful financial management in the defence sector, including investments in human resources, is a key factor in increasing efficiency and reducing costs. The researchers noted that effective modernisation involves not only improving technical performance but also optimising human resources costs, which is a prominent aspect of the overall strategy.

Current research in the field of human resources policy and defence economics is actively exploring the issue of optimising costs and increasing the efficiency of the armed forces through improved human resources management. Within the framework of this review, it is important to focus on the various approaches and findings obtained by researchers.

A. Calcara & L. Simón (2024) analysed the cooperation between France and Germany in the context of the development of the European defence industry. They emphasised the significance of collective efforts in the defence sector to achieve economic efficiency, specifically through the coordination of human resources policies and cost rationalisation. T. Dyson & Y. Pashchuk (2022) examined the learning and adaptation process of the Ukrainian Armed Forces during the conflict in Donbas, focusing on the implementation of feedback processes and 'lessons learned'. Their study showed that systemising human resources processes can increase efficiency and reduce resource losses in a protracted conflict.

M. Domínguez *et al.* (2023) assessed productivity changes in North Atlantic Treaty Organization (NATO)

countries with a focus on the impact of economic performance on the defence sector. The researchers concluded that the productive use of resources, specifically through workforce planning, positively affects defence capability by minimising costs. P.Y. Lindgren & A. Ofstad Presterud (2021) examined unemployment and recruitment in the Norwegian armed forces, highlighting the economic benefits of recruitment during periods of high unemployment. Their study showed a strong correlation between the labour market and personnel policy, which affects cost optimisation in military structures.

Despite considerable interest in the issue of effective management of defence resources, some aspects, such as the relationship between costs and human resources policy, are still understudied. Existing studies, such as those by F. Coticchia & F.N. Moro (2023), focused on the problems of adapting armed forces to modern conflicts, but lacked a detailed analysis of the impact of human resources policy on cost reduction. M.H. Danley (2023) raised the issue of resource availability for military structures, but did not provide a clear understanding of how cost-effective human resources management can improve the financial performance of the defence sector.

The purpose of this study was to identify effective approaches to human resources policy that contribute to cost optimisation and efficiency in the armed forces. The study sought to identify the links between human resources management and cost-effectiveness in the defence sector, as well as to analyse concrete human resources strategies that can reduce costs without compromising defence capabilities. The tasks of the study were as follows:

- to identify the key factors that influence the effectiveness of personnel policy and cost optimisation;
- to analyse the models of personnel management in the armed forces of different countries to assess their cost-effectiveness;
- to establish the relationship between economic efficiency and personnel policy in the armed forces;
- to develop recommendations for the implementation of human resources strategies to reduce costs without losing combat capability.

Materials and Methods

The study of human resources policy and economic efficiency of the armed forces was based on the analysis of academic sources, strategic reports of defence ministries, and statistics from national and international resources. The study covered the defence structures of various countries, including NATO member states, the EU, and other states with developed defence systems – the United States, the United Kingdom, Germany, Sweden, Canada, Australia, Israel, France, Italy, Spain, India, Romania, Pakistan, Norway, and Ukraine.

The primary sources of information included analytical reports of the Ministry of Defence of the United Kingdom (2024), which cover issues of economic efficiency and human resources policy. Other valuable sources were the analytical materials of the Department of Defence of

the United States (2024), covering defence resource management and the specifics of human resources policy in the armed forces, as well as the strategic review of Australia's defence policy, which highlights its specifics in the field of human resources management (Australia's 2023 defence..., 2023). The study also considered the strategic commentary on the reform of India's defence system, which highlighted changes in personnel policy and resource management (India's defence transformation, 2022).

The key research methods used were content analysis, comparative analysis, and SWOT analysis. Content analysis was used for a systematic review of scientific sources and strategic documents, which helped to identify key human resources factors that affect the economic efficiency of the armed forces. This method provided a structured approach to exploring various aspects of human resources policy, including professional selection, training, social support, and technological support. The comparative analysis helped to evaluate different models of human resources management in the armed forces of different countries, comparing their economic benefits, as well as their impact on combat readiness and operational sustainability.

A SWOT analysis was used to comprehensively assess the human resource management models. This method helped to identify the strengths, weaknesses, opportunities and threats to each model of human resources policy. The SWOT analysis was particularly useful in identifying the advantages and disadvantages of approaches such as contract recruitment, long-term planning, short-term training programmes, intensive training rotation, and hybrid models. The SWOT analysis helped to assess which human resources policy models are best suited to strike a balance between cost-effectiveness and readiness.

This analysis formed the basis for the development of recommendations for optimising human resources policy in the armed forces. Through a systematic review of scientific sources and strategic documents, content analysis helped to identify key human resources factors that affect economic efficiency and combat readiness. A comparative analysis of human resource management models in various countries helped to assess their economic feasibility and effectiveness in specific contexts.

To ensure the reliability of the data, the study used standardised cost and combat capability indicators recommended by international analytical institutions such as the Stockholm International Peace Research Institute (2024) and the European Defence Agency (2024), which offer unified approaches to assessing the effectiveness of defence structures.

Results

The effectiveness of human resources policies in the armed forces significantly affects the overall economic sustainability of the defence sector. Careful planning, recruitment, training programmes, and social support are crucial for optimising personnel costs and maintaining combat capability. A content analysis of current research and strategic reports from defence ministries in various countries

revealed a series of key factors that influence the effectiveness of human resources policy.

Effective career planning contributes not only to staff motivation, but also to staff stability, reducing the need for frequent recruitment. Many countries, such as the United States and the United Kingdom, are actively implementing career planning systems that allow personnel to see their growth prospects. This includes gradual promotion of military personnel based on their experience and qualifications. This approach reduces the costs associated with recruitment and extra training of new recruits and prevents shortages of specialists. Career planning systems that ensure gradual advancement can reduce staff turnover and stabilise personnel, which positively affects the overall effectiveness of the armed forces (Edström & Gyllensporre, 2023). The cost of extra education and training of new personnel is then reduced by maintaining a stable staff.

Exact standards of recruitment are critical to ensuring the quality of the armed forces. Selection based on specific qualification requirements helps to reduce training costs, as candidates with basic skills and knowledge are attracted at the recruitment stage. For instance, Germany and Sweden have strict requirements for recruits, including psychological tests, physical fitness, and technical skills (Panesar, 2022). Selection based on high standards ensures that quality personnel are ready for service without the need for lengthy extra training. It also contributes to cost savings by reducing the number of individuals who do not complete their contract due to inadequate performance.

Continuing education and training are key aspects of maintaining the competence of military professionals. The lack of regular professional development can lead to a loss of relevant knowledge and skills, which affects overall performance. Lifelong learning systems, including regular training and courses, help to maintain the professional readiness and flexibility of military personnel. Investing

in training contributes to long-term cost-effectiveness by reducing the need to constantly recruit new personnel. It also reduces the cost of specialised training, as trained personnel are more easily adaptable to changing service conditions.

Social support and psychological support are crucial for retaining personnel in the armed forces, reducing the cost of frequent recruitment and replacement. The psychological well-being of military personnel directly affects their readiness to perform tasks. In NATO countries, including the United Kingdom and Canada, psychological care and support programmes are being implemented for military personnel and their families. Such programmes help to maintain a stable workforce and reduce the costs associated with staff turnover. Support aimed at the psychological well-being of the military considerably reduces stress levels and improves morale, which positively affects the effectiveness of the armed forces.

Modern armed forces require not only physical training but also skills in working with the latest technologies. The use of modern equipment requires an adequate level of knowledge and skills from military personnel, and therefore technology training is becoming a priority. Military personnel with technological skills can use resources more efficiently, which reduces the overall cost of servicing and maintaining equipment.

The introduction of technology into personnel training also provides flexibility in solving complex tasks requiring specialised knowledge and helps reduce the cost of lengthy training of new personnel. The use of technologically skilled personnel is becoming a crucial component of a successful human resources policy focused on cost-effectiveness.

For a more detailed study of these factors, a table was compiled to illustrate the key factors of human resources policy and their effect on economic performance in the armed forces of various countries (Table 1).

Table 1. Key factors of personnel policy in the armed forces and their effect on economic efficiency

Personnel policy factor	Description	Effect on economic indicators	Countries
Career growth planning	Systematic promotion of staff based on experience and qualifications	Reduces staff turnover and recruitment costs	United States, United Kingdom, India
Professional selection	Strict selection of recruits according to psychological, physical, and technical standards	Reduces the cost of extra training and dropout rates	Germany, Sweden
Qualification improvement and training	Regular training and development programmes to maintain professionalism	Reduces the need to replace staff and the cost of specialised training	Canada, Australia
Social support and psychological care	Psychological support and social security programmes for the military and their families	Reduces stress levels and replacement costs due to staff turnover	United Kingdom, Canada
Technological support	Training staff to work with the latest technologies	Increases resource efficiency and reduces maintenance costs	Israel, United States

Source: created by the authors based on data from the Department of National Defence supports the Canadian Armed Forces (n.d.), Israel's Ministry of Defence (n.d.), India's Ministry of Defence (n.d.), Ministry of Defence of Pakistan (n.d.), Ministry of Defence of Ukraine (n.d.), Australia's 2023 Defence Strategic Review (2023), Ministry of Defence of the United Kingdom (2024) and Department of Defence of the United States (2024), European Defence Agency (2024), Stockholm International Peace Research Institute (2024)

To illustrate the effectiveness of the above factors, it is useful to provide a graph comparing the costs of key aspects of personnel policy, such as training and social

support, and their effect on the overall effectiveness of the armed forces in the most defensively effective countries in Europe (Fig. 1).

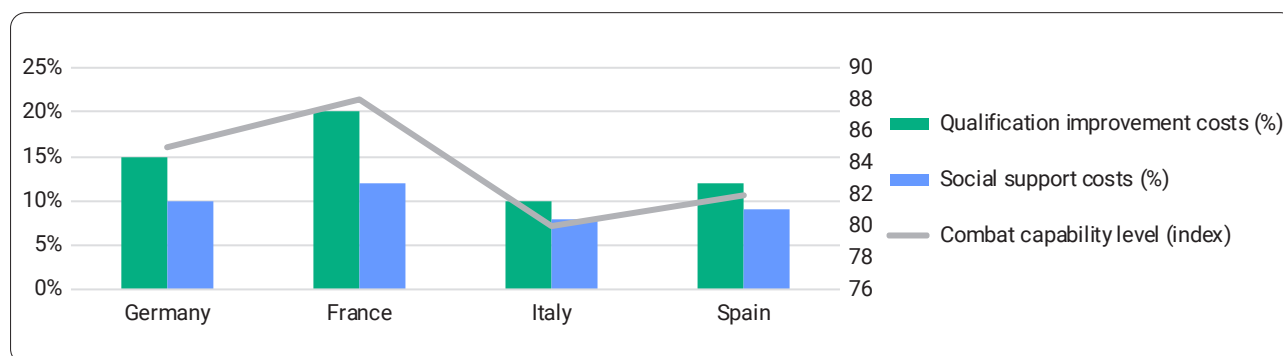


Figure 1. Comparison of the costs of various factors of human resources policy in selected European countries

Source: created by the authors based on data from A. Calcara & L. Simón (2024)

In the case of Ukraine, the personnel policy of its defence sector is aimed at adapting to new security challenges, increasing the professionalism of military personnel, and ensuring proper training of personnel. One of the key aspects is the professionalisation of the Armed Forces of Ukraine, which involves a gradual transition from conscription to contract staffing (Kormych *et al.*, 2024). This allows improving the quality of personnel training and ensuring a greater level of reliability in the face of modern threats.

Training and retraining of military personnel are also being actively reformed. Ukrainian military educational institutions, including the National Defence University of Ukraine, are adapting their training programmes to NATO standards, involving international partners, which increases the level of professionalism among officers and sergeants (Shahini *et al.*, 2024). Particular attention is paid to psychological support and rehabilitation of servicemembers, considering the conditions of combat operations. Psychological support and rehabilitation programmes after combat situations help to reduce the rate of dismissals due to psychological problems and maintain personnel stability in military units. Social protection of servicemembers and their families is another crucial element of the personnel policy. Programmes are in place to improve housing conditions, medical care, access to education, and retraining after military service. These measures are intended to raise the prestige of the military profession, attracting new candidates to military service. Ukraine also seeks to ensure gender equality in the armed forces by developing programmes that promote the role of women in the military. This allows expanding the personnel base and incorporating gender aspects into personnel management. Another major area of personnel policy is the integration of NATO standards, which involves adapting training, personnel management, and social support methods to the Alliance's standards (Kostyuk & Brantly, 2022). This helps to strengthen defence structures and increases the efficiency of human resource management.

Furthermore, considerable attention is paid to fighting corruption and ensuring transparency of personnel policy, which increases trust in military structures and ensures more efficient use of resources. However, challenges persist in the form of the need for extra funding to implement programmes, strengthen human resources in the context of military conflict, and further implementation of new training standards that capture the current experience of combat operations.

Economic efficiency in the defence sector largely depends on the chosen human resources management model. Countries use varying approaches to recruitment, training, and retention of military personnel, aimed at reducing costs and increasing functional efficiency. Contract recruitment is an effective way of managing personnel, used in many countries to reduce staffing costs. This model involves short- or medium-term contracts, which allows for flexible management of staffing levels to adapt to current defence needs. Engaging civilians to fill non-critical positions in the defence sector also contributes to cost savings, as the salary fund for such positions is lower. Employing civilians in positions such as logistics and administration reduces overall costs while maintaining a strong level of functionality (Yatsiv *et al.*, 2024). This approach allows spending to be focused on key combat personnel, thus increasing the efficiency of the defence sector overall.

In countries that prioritise staff stability and professional growth, the long-term workforce planning model is actively used. This model is aimed at supporting highly qualified specialists by providing them with career prospects and long-term contracts. This approach helps to reduce the cost of permanent recruitment and increases the motivation of the military to stay in service for a long time.

A. van Vark (2021) highlighted that long-term workforce planning reduces the costs associated with personnel replacement and contributes to the formation of highly professional personnel. In the case of Norway, for instance, the implementation of long-term contracts

for key personnel has increased efficiency while reducing the number of recruitments and the cost of training new personnel.

In cases where the defence sector needs to recruit personnel quickly for temporary or specialised tasks, short-term training programmes can be effective. These programmes are aimed at quickly teaching the basic skills needed to perform particular tasks, including in emergency situations. The advantage of this model is that it reduces training costs and responds quickly to current needs. The use of short-term training programmes during periods of increased tension enabled recruits to quickly adapt to concrete tasks without the need for long-term courses (Caliskan & Liégeois, 2020). This saves money in the short term, especially when staffing needs are temporary.

The rotation of personnel with intensive training is another model that allows for the efficient use of available resources without incurring considerable extra costs. Military personnel who already have basic training undergo periodic training to develop new skills and improve their qualifications. This provides flexibility in the distribution of personnel to fill various positions and reduces the cost of new recruitment.

In some countries, such as the United States and the United Kingdom, defence institutions use hybrid human resource management models, combining elements of contract recruitment, long-term planning, and short-term training programmes. This enables flexible adaptation of the number and training of personnel depending on the situation. Thus, in cases of temporary threats or crises, short-term contracts are used, while core staff are maintained on long-term contracts. For example, hybrid models implemented in Romania allow for operational readiness while reducing the cost of long-term staffing (Jude, 2022). Such a model demonstrates cost-effectiveness, allowing for optimum resource management and increased functionality of military structures.

SWOT analysis was applied to the human resources management models of the armed forces of countries such as the United States, the United Kingdom, Germany, Sweden, Canada, Australia, Israel, France, Italy, Spain, India, Romania, Pakistan, Norway, and Ukraine to examine their characteristics in detail, which helped to identify the strengths and weaknesses of each approach, as well as the opportunities and threats they pose to the cost-effectiveness of the defence sector (Table 2).

Table 2. SWOT analysis of personnel management models in the armed forces of the United States, the United Kingdom, Germany, Sweden, Canada, Australia, Israel, France, Italy, Spain, India, Romania, Pakistan, Norway, and Ukraine

Parameter	Description
Strengths	Contract hiring: allows for flexible adaptation of the number of staff, reducing staffing costs.
	Long-term workforce planning: ensures the stability and development of staff qualifications, reducing the cost of frequent recruitment.
	Rotation with intensive training: maintains staff flexibility and multifunctionality, avoids new recruitment.
	Hybrid model: combines elements of multiple approaches to adapt to situational needs, optimising costs and maintaining readiness.
Weaknesses	Contract hiring: risk of low motivation due to the short-term nature of contracts, low loyalty to military service.
	Long-term planning: requires high costs for long-term staff retention and career development prospects.
	Short-term programmes: effective only for basic tasks; may reduce professionalism.
	Hybrid model: can complicate personnel management due to the heterogeneity of approaches, especially when different models are used simultaneously.
Opportunities	Engagement of civilian specialists: reduces costs by focusing military resources on combat positions.
	Intensive training and rotation: reduces the need for new recruitment and allows for a stable level of expertise.
	Hybrid models: Enables adaptation of the number and structure of personnel in case of emergencies or temporary threats.
Threats	Long-term planning: reduces the cost of training new staff and stabilises the professional composition.
	Dependence on short-term staff: may affect the ability to operate in case of a prolonged emergency.
	High competition for skilled personnel: especially for civilian professionals, who are also recruited by the private sector.
	Unstable funding: may limit the ability to use long-term models and deploy hybrid approaches.
	Risks of short-term programmes: insufficient training can affect operational effectiveness in complex tasks.

Source: created by the authors based on data from the Department of National Defence supports the Canadian Armed Forces (n.d.), Israel's Ministry of Defence (n.d.), India's Ministry of Defence (n.d.), Ministry of Defence of Pakistan (n.d.), Ministry of Defence of Ukraine (n.d.), Australia's 2023 Defence Strategic Review (2023), Ministry of Defence of the United Kingdom (2024) and Department of Defence of the United States (2024), European Defence Agency (2024), Stockholm International Peace Research Institute (2024)

Such an approach helps not only to assess the extent to which each model contributes to cost optimisation and sustainment, but also to identify potential areas for

improvement. By considering contract recruitment, long-term workforce planning, short-term training programmes, intensive rotational training and the hybrid

model, the SWOT analysis provides a comprehensive assessment of which model best meets the specific needs of military structures in different situations.

Human resources policy in the defence sector is closely linked to cost-effectiveness, affecting budgetary expenditures and the maintenance of the armed forces' combat capability. Establishing the link between personnel costs and functional effectiveness requires the analysis of indicators that reflect how investments in personnel policy affect productivity, crisis resilience, and combat readiness.

Investments in personnel training and career development support are a crucial factor in ensuring readiness. Studies show that countries that invest heavily in training and professional development demonstrate higher levels of combat readiness and operational effectiveness. In cases of crisis, such personnel adapt more quickly to new conditions, having a better level of technical and strategic training.

Countries with a great level of investment in training, such as the United States and the United Kingdom, maintain a consistently strong level of combat readiness and can conduct military operations more effectively. The example of Romania, where vocational training programmes are being actively implemented, demonstrates that such investments increase the efficiency of resource use and save on the cost of hiring external specialists (Nemeth, 2024).

Providing social support for military personnel and their families affects the economic efficiency of the defence sector by reducing staff turnover and boosting morale. A strong psychological resilience of personnel reduces the costs associated with the replacement and rehabilitation of military personnel facing severe stress.

An analysis by the RAND Corporation shows that NATO countries, including Canada, are actively

implementing psychological support programmes for military personnel, which helps to reduce the rate of dismissals due to psychological problems and reduces the cost of recruiting and training new personnel.

One key aspect of cost-effectiveness is investing in technological skills training that enables the military to effectively use modern equipment and innovative systems. The introduction of advanced technologies in military training reduces the cost of maintaining equipment, increasing productivity and functional readiness. In Europe, particular focus is being placed on the introduction of technology into the defence sector, which considerably increases the efficiency of using available resources. Training personnel to work with the latest technologies reduces the cost of lengthy training and saves on the maintenance and operation of equipment due to its more competent use.

Another major aspect is the ability of the military to adapt to crisis situations, which depends on the effectiveness of human resources policy. Countries that invest in long-term retention strategies demonstrate a greater level of resilience to unforeseen situations. Military personnel with experience and psychological resilience are better prepared to meet challenges, which minimises the cost of crisis management.

The defence sectors of the countries considered in this study demonstrate considerable diversity in their approaches to security, resource allocation, and strategic priorities. The key factors that determine the specific features of the defence structures of these countries include the military budget, the number of military personnel, the technological level, personnel training, the presence of a defence industry, and membership in international security organisations such as NATO or the EU (Hooker, 2022). A comparison of these criteria in different countries is presented in Table 3.

Table 3. Comparison of the key parameters of the defence sector in various countries

Country	Military budget (USD bn)	Number of military personnel (thsd people)	Key defence priorities	Membership in organisations
United States	801	1,380	Global security, nuclear deterrence	NATO
United Kingdom	68	148	European security, strategic deterrence	NATO
Germany	55	183	European security, NATO	NATO, EU
Sweden	7	20	Territorial defence	NATO
Canada	26	68	North American security, international missions	NATO
Australia	44	59	Regional security in the Asia-Pacific region	ANZUS
Israel	24	170	Missile defence, regional security	–
France	56	205	Nuclear deterrence, European security	NATO, EU
Italy	32	165	NATO, international missions	NATO, EU
Spain	19	124	European security, NATO	NATO, EU
India	77	1,450	Regional security, confrontation with Pakistan	–
Romania	5	70	Regional security, modernisation	NATO, EU
Pakistan	10	654	Confrontation with India, internal security	–
Norway	8	25	Territorial defence	NATO

Table 3, Continued

Country	Military budget (USD bn)	Number of military personnel (thsd people)	Key defence priorities	Membership in organisations
Ukraine	44	700	Defence against external aggression, NATO support	–

Source: created by the authors based on data from the Department of National Defence supports the Canadian Armed Forces (n.d.), Israel's Ministry of Defence (n.d.), India's Ministry of Defence (n.d.), Ministry of Defence of Pakistan (n.d.), Ministry of Defence of Ukraine (n.d.), Australia's 2023 Defence Strategic Review (2023), Ministry of Defence of the United Kingdom (2024) and Department of Defence of the United States (2024), European Defence Agency (2024), Stockholm International Peace Research Institute (2024)

Table 3 demonstrates considerable differences between countries in terms of funding, personnel, and key defence priorities, reflecting both national strategic objectives and military capabilities. According to the table, the United States has the largest defence budget in the world, which allows it to invest heavily in advanced technology, intelligence, and global military operations. The United Kingdom and France also have high defence spending and maintain a nuclear arsenal that provides strategic deterrence. Germany has been increasing its defence budget in recent years due to NATO requirements and strengthening its defence capabilities but has historically focused on European security. Sweden and Norway have considerable forces to defend their territories, with Sweden recently joining NATO, increasing its strategic significance.

Canada and Australia are close allies of the United States, supporting defence efforts globally, especially in the Asia-Pacific region. Israel is noted for its defence innovations, particularly in cybersecurity and missile defence systems. India and Pakistan possess nuclear weapons and are focused on regional defence, while both countries are investing heavily in modernising their armed forces. Romania and Ukraine are actively modernising their defence systems due to their proximity to conflict regions, with Ukraine relying heavily on support from Western partners. Italy and Spain have well-organised military forces that support international missions of NATO and the UN.

Based on the study conducted, recommendations were developed to improve the cost-effectiveness of the armed forces by optimising human resources policies. The use of human resources strategies that focus on long-term training, adaptability, social welfare, and technological training can reduce costs without compromising the functional readiness of the armed forces.

Flexible recruitment programmes are recommended to maintain stability and reduce the cost of permanent recruitment. This can include short-term contracts for personnel performing non-critical functions and long-term contracts for highly qualified military personnel. Flexible programmes enable the best use of resources, reducing staffing costs. Long-term contracts also help to retain qualified personnel, reducing the need for constant recruitment, and cutting training costs. This approach reduces staff turnover, which contributes to stability and cost savings.

An effective human resources policy involves continuous training and development to ensure that staff can

meet modern challenges (Novykova *et al.*, 2022). It is recommended to develop regular professional development programmes, including trainings, certifications, and specialised courses. Such programmes can reduce the cost of training new recruits while ensuring the continuous development of existing staff skills. Countries that invest in the professional development of their military demonstrate a greater level of cost-effectiveness, as trained personnel are more easily adaptable to change. This reduces the cost of extra training, as personnel maintain their qualifications at the required level.

One of the key recommendations is to introduce psychological support and social welfare programmes for military personnel and their families. Creating a supportive environment helps to retain personnel and boost morale, which reduces the cost of frequent recruitment due to staff turnover. Psychological support programmes reduce stress levels, which helps to maintain stability and productivity. Social programmes also help to support the military in crisis situations, contributing to their ability to adapt. These programmes include access to healthcare, financial aid, and other social benefits that support strong staff engagement and reduce the costs of dismissals.

Considering the rapid development of technology, military personnel must be skilled in the use of modern equipment. It is recommended to include mandatory technological training programmes in the personnel policy to enable the military to adapt to the latest technological systems. This will increase the efficiency of resource use and reduce maintenance costs through skilful handling of equipment. Investing in technology training can increase the flexibility of personnel and their readiness to work in a rapidly changing environment, while ensuring long-term cost-effectiveness. Preparing the military to use technology reduces maintenance costs and increases productivity.

To reduce costs in non-security-critical areas, it is recommended to engage civilian specialists, such as logisticians, administrators, and medical personnel. The use of civilians to perform support functions can reduce salary costs, as civilian personnel are usually cheaper than military personnel (Kyrylov *et al.*, 2024). Civilians can provide support services, allowing the armed forces to focus on core combat missions without having to divert resources to support functions. This reduces the cost of providing military personnel for non-critical functions, leaving more resources to maintain combat readiness.

To continuously improve the personnel policy, it is recommended to introduce systems of feedback and regular evaluation of personnel. This allows problems, such as low productivity or lack of motivation, to be promptly identified and corrective action taken. Evaluation programmes help to improve the effectiveness of human resources policies and ensure that resources are used accurately to meet staff needs. Implementation of a feedback system and regular personnel assessment enables not only prompt identification of problems, but also the development of individual development plans for staff. This approach increases employee motivation as they gain a clear understanding of their strengths and areas for improvement. Furthermore, assessments allow for efficient allocation of human resources by identifying which skills and competencies should be strengthened within the human resources policy.

Assessment systems also promote transparency in career development decisions, which increases staff trust in management. Regular feedback ensures more effective

communication between service members and commanders, fostering a culture of openness and support. Military service is often associated with elevated stress levels, which can lead to staff exhaustion. The introduction of flexible working arrangements and leave opportunities, especially for personnel in difficult environments, can help to increase productivity and reduce the risk of turnover. Flexible schedules allow for a work/life balance that positively affects efficiency at no extra costs.

The use of reservists to perform auxiliary or temporary tasks can greatly reduce the cost of maintaining permanent staff. Reservists are deployed on an ad hoc basis, which reduces the cost of permanent staff while ensuring that functionality is maintained in crisis situations. The use of reserve forces increases the flexibility and efficiency of the defence sector. To summarise all the recommendations, a table was compiled that shows their key economic advantages and benefits for maintaining the readiness of the armed forces (Table 4).

Table 4. Recommendations for optimising the personnel policy of the armed forces: economic benefits and advantages for combat capability

Recommendation	Description	Economic benefits	Advantages for combat capability
Flexible hiring programmes and long-term contracts	Introduction of short-term and long-term contracts to reduce recruitment costs	Reduces the cost of frequent recruitment	Ensures personnel stability
Support for professional development and continuous learning	Regular training and certification for current personnel	Reduces the cost of training new recruits	Ensures highly qualified personnel
Social support and psychological resilience	Social support and psychological support programmes	Reduces personnel turnover	Improves the morale of the military
Technological training and competence development	Training personnel to work with modern technologies	Reduces maintenance costs	Increases technological readiness
Engagement of civilian specialists for non-critical functions	Engagement of civilians in support roles	Reduces payroll costs	Focus on combat functions
Feedback and evaluation programmes	Regular evaluation of personnel performance to adjust policies	Optimises the use of resources	Maintains a strong productivity level
Flexible service and leave schedules	Introduction of flexible working hours to reduce stress	Reduces turnover costs	Supports the psychological health of the military
Use of reserve forces	Engagement of reservists to perform auxiliary tasks	Reduces the cost of a permanent staff	Increases flexibility in times of crisis

Source: created by the authors

Table 4 illustrates key recommendations that can substantially improve the cost-effectiveness of human resources policy in the armed forces without compromising combat capability. Each of the strategies presented has considerable economic benefits, including reduced personnel costs, optimised resources and reduced turnover. At the same time, these measures contribute to boosting morale and resilience of personnel to stress, as well as maintaining a strong level of combat readiness.

The proposed approaches allow the armed forces to adapt flexibly to changing conditions, ensuring a balance between costs and the need for qualified personnel. Thus, the implementation of these recommendations will contribute not only to the stability of personnel, but also to the

efficient allocation of resources, which is critical for long-term sustainability and successful defence tasks.

For Ukraine, which is in the midst of an active military conflict, the implementation of recommendations to optimise human resources policy is a crucial step towards strengthening the combat capability and economic sustainability of the armed forces (Dzhulai, 2023). Considering the prominent level of personnel mobility and the need to maintain morale, it is advisable to introduce flexible recruitment programmes and contracts of various durations. This will help reduce the cost of permanent recruitment and ensure stability in military units, especially at the frontline.

Professional development and continuous training are essential to improve the skills of existing personnel, which,

in the context of the rapid introduction of modern military technologies, will help optimise the cost of training recruits and ensure high readiness for complex tasks. Psychological support and social care for the military and their families are also critical in the context of prolonged hostilities. Psychological support programmes will help to reduce personnel turnover and maintain military morale, which is essential for maintaining combat capabilities.

Furthermore, the development of technological competencies among personnel will enable them to effectively use the latest defence and communications equipment, which will help to increase the technological readiness of the Armed Forces of Ukraine and reduce equipment maintenance costs. The use of civilian specialists to perform support tasks, such as logistics, technical support, and medical care, will allow military specialists to focus on combat functions, optimising salary costs, and increasing the overall effectiveness of the defence capability.

The use of reservists to support auxiliary tasks will help Ukraine maintain flexibility in crisis situations by providing an operational reserve for combat operations. Implementation of these recommendations will allow Ukraine to increase combat capability, optimise the use of resources and stabilise the personnel, which is crucial for successful defence and national security in the face of prolonged confrontation.

Discussion

The analysis of the study findings showed the value of an integrated approach to human resources management in the armed forces to enhance economic sustainability and combat capability. Key aspects, such as career planning, selection standards, professional development, and social support, have a decisive impact on the efficiency and sustainability of the defence sector. Comparing these findings with those of other authors allows assessing the consistency of the results and highlighting areas for further research.

H. Edström & D. Gyllensporre (2023) confirmed that career planning systems that provide gradual promotion and development prospects reduce staff turnover and contribute to cost savings. This is in line with the findings of the present study on the role of career planning as a method of stabilising the workforce and reducing recruitment costs. At the same time, M. Mantovani & R. Müllhaupt (2021) noted that long-term career development programmes can create an incremental burden on the budget due to long-term development investments. The above findings, while confirming the high cost-effectiveness of this approach, point to the significance of balancing investments in career development with short-term staffing needs to avoid budget overload.

Recruitment standards, as evidenced by R. Pansar (2022) and the present study, also significantly affect the cost-effectiveness of the armed forces. The analysis noted that strict requirements for candidates, including psychological and physical tests, reduce training costs and ensure better readiness of recruits. This is consistent with the findings of M. Mantovani & R. Müllhaupt (2021), who also emphasised that strict selection standards contribute

to the retention of highly qualified personnel. However, T. Bunde (2021) pointed out that excessive standardisation of requirements can limit access to military service for individuals with potentially useful skills, which can reduce the adaptability of the armed forces. Thus, the question of the optimum level of selection rigour requires further study to determine the balance between quality and flexibility.

Professional development and regular training of personnel are also important aspects of cost-effectiveness, as the study showed. Maintaining the skills of the military at a certain level helps to maintain readiness and avoid extra costs for personnel replacement. These findings are consistent with those of A. Connelly & S. Loong (2023), who also emphasised the value of investing in continuous training to improve the overall effectiveness of the armed forces. At the same time, J. Horncastle (2022) pointed out the need to adapt training programmes to rapidly changing defence technologies, which requires a more flexible approach than conventional training methods.

Social support and psychological support, as confirmed by the present study, are critical to maintaining the stability of the personnel and saving on permanent recruitment. This is consistent with the findings of I. Antai *et al.* (2023), who emphasised the role of social programmes in staff retention. However, J. Horncastle (2022) also indicated that social support can become an incremental financial burden for defence budgets if not integrated into a broader human resource management strategy. Thus, the findings highlight the significance of a balance of social support to maintain economic sustainability.

The analysis of the findings on the significance of technological training in the armed forces confirms the role of technological skills in increasing economic efficiency. Preparing the military to work with the latest technologies enables efficient use of available resources, reducing the cost of equipment maintenance, and increases flexibility and responsiveness in performing complex tasks. The findings of this study are supported by F. Wenas Inkiriwang (2020), who pointed out that investments in technological training are essential for the operational diplomacy of the defence sector, especially in the context of the active use of modern equipment and increasing technical requirements for personnel.

At the same time, S. Rolfe & I. Anderson (2022) study focusing on the needs of veterans indirectly corroborated the value of technological training, as the adaptation of personnel to civilian life also often depends on the acquired technological skills. This shows that investments in technological training have a long-term impact on the social and economic stability of personnel after service, which is consistent with the findings on the economic feasibility of such policies.

The analysis of Ukraine's defence human resources policy highlights the significance of adapting to new security challenges, especially in the context of conflict and integration into NATO standards (Ivanov *et al.*, 2020). The findings showed that professionalisation and social support for the service personnel contribute to human resources stability and increase the combat capability of the Armed Forces of Ukraine.

B. Kormych *et al.* (2024) stressed the need for flexible approaches to protection, including the creation of humanitarian corridors, which requires personnel stability and readiness. The study by N. Kostyuk & A. Brantly (2022) on cyber warfare showed the limitations of interstate cooperation in protecting infrastructure, which confirms the role of technological training and highly qualified personnel. Psychological support, according to K. Kravchenko *et al.* (2023), is critical for maintaining combat readiness and reducing staff turnover.

The findings of the study on various models of personnel management in the armed forces confirmed that the economic efficiency of the defence sector largely depends on the choice of approach to recruitment, training, and retention. Comparison with the findings of other researchers offered a deeper understanding of why certain models provide higher functional efficiency and at the same time contribute to cost reduction.

The findings on contracting and civilian recruitment are consistent with those of D. Druck (2021), who analysed approaches in Israel. The study noted that the reduction of permanent staff in favour of contract workers allows saving resources for strategically significant positions. However, according to M. Riemann & N. Rossi (2022), in crisis situations, the contract model can pose challenges due to the instability of the staff, which requires extra adaptation and planning.

The conclusions on the economic efficiency of long-term workforce planning coincide with those of H. Edström & D. Gyllensporre (2023), who indicated that the Nordic countries, by investing in long-term staff retention, managed to stabilise the workforce and reduce recruitment costs. At the same time, V. Vignoli (2024) addressed the risks associated with the costs of social support under such programmes, especially when the country's economic conditions change, which can make long-term planning challenging.

The use of short-term training programmes was found to be an effective way to respond quickly to crisis situations. This conclusion is supported by India's defence transformation (2022), which highlighted that short-term training provides operational flexibility in emergencies. However, V. Vignoli (2024) pointed out the limitations of short-term programmes in cases where personnel need to be integrated into longer missions that require extra skills.

The rotational model with intensive training, according to E. Sabatino (2022), allows maintaining a strong level of competence among personnel without the need to constantly recruit new personnel. The findings presented in this study confirm this, demonstrating that rotation promotes flexibility and reduces the cost of new staff. Therewith, M. Riemann & N. Rossi (2022) indicated that frequent rotation can lead to staff attrition in cases of long and intense operations.

In terms of hybrid models, the study findings suggested that a combination of contract hiring, long-term plans, and short-term training programmes can provide optimum flexibility and savings. This is confirmed by S. Jude (2022), who noted the effectiveness of hybrid models in the Romanian context. However, D. Druck (2021) pointed out the

potential difficulties in managing such a heterogeneous workforce, which may require extra coordination costs.

The study showed that an effective personnel policy is a key factor in the economic stability and combat capability of the armed forces. The analysis of the data and their comparison with the studies of other researchers emphasise the value of investing in training, social support, and technological skills.

B. Nemeth (2024) noted that investment in training is crucial for maintaining combat readiness and effective military operations, which is consistent with the results presented in this study. Both Nemeth's and the present findings highlighted those countries with active training programmes, such as the United States and the United Kingdom, achieve stable readiness rates, which enables faster response to crises and efficient allocation of resources. This is in line with the findings of C. Håkansson (2021) on the significance of technological innovation in the EU armed forces, which promotes the economical use of resources, releasing funds for other strategic needs.

The findings on social support and psychological resilience are also in line with those of T. Bradshaw (2021), who highlighted that maintaining military morale, especially through specialised programmes for veterans, contributes to the stability of the personnel. Psychological support programmes implemented in Canada reduce recruitment costs and increase cost-effectiveness by reducing staff turnover. In this aspect, the study is also consistent with the findings of D. Dudley (2020), who noted that defence sector reforms in Montenegro aimed at psychological support are essential to build resilience and reduce the cost of training new personnel.

Investing in the technological skills of military personnel is critical to ensuring functional effectiveness. As the study findings showed, training the military to operate modern equipment and technologies is essential to reduce maintenance costs. This is in line with the findings of Australia's 2023 Defence Strategic Review (2023), which emphasised that technology training for the military avoids unnecessary maintenance costs and reduces the need for external experts to support the latest systems.

An analysis of the defence sector in various countries revealed considerable differences in funding, military strength, priorities, and international commitments. The United States has the largest defence budget in the world, which supports its global military presence. The United Kingdom and France also spend heavily on defence, while maintaining nuclear arsenals for European deterrence. Germany is strengthening its defence capabilities in response to NATO requirements. Sweden and Norway are focusing on territorial defence, while Sweden's accession to NATO increases its strategic significance. Canada and Australia support global defence initiatives, especially in the Asia-Pacific region. Israel stands out for its innovations in cybersecurity and missile defence, which are essential for regional stability. India and Pakistan are developing nuclear capabilities while modernising their armed forces.

Comparing the present study with those of R.D. Hooker (2022) and M. Caliskan & M. Liégeois (2020), there is a consistency with the general assessment of NATO. R.D. Hooker stressed the value of sustained defence investment in maintaining regional security, as evidenced by the high spending by the United States, the United Kingdom, and France. R.D. Hooker also noted that NATO must adapt to new threats, which is relevant considering the growth of defence spending in Europe. M. Caliskan & M. Liégeois noted that the concept of 'hybrid warfare' complicates NATO's strategic planning, confirming the need for approaches to respond to asymmetric threats. Israel's experience in implementing innovations to combat hybrid threats can be useful for NATO countries (Vilks *et al.*, 2024).

The recommendations developed based on the study support current trends in defence personnel policy, which are focused on increasing the cost-effectiveness and adaptability of the armed forces. The significance of flexible recruitment programmes, including the use of civilians for support functions, is consistent with the findings of V.M. Santos & M. Siman (2022), who emphasised the economic benefits of using civilians in non-critical roles. This releases resources to support combat readiness, which is in line with the strategic needs of the armed forces.

A study by F. Wenas Inkiriwang (2020) reinforced the role of technology training, as the development of technological skills of the military increases their flexibility and effectiveness in performing tasks. The use of advanced technologies helps to reduce maintenance costs by reducing the need for external experts and increases productivity, which was considered in the recommendations for the implementation of technology training programmes to improve functional readiness.

In terms of social support and psychological well-being, the study findings are in line with the recommendations of T. Bunde (2021), who emphasised the significance of social stability and psychological support for retention. The recommendations include psychological care and support programmes for military families, which helps to reduce staff turnover and maintain high morale, contributing to the economic stability of the defence sector.

The use of reservists as an alternative resource for crisis situations is in line with the findings of the India's defence transformation (2022) study, where reserve forces are used to maintain operational flexibility. This reduces the cost of maintaining a permanent force while maintaining combat capability in a crisis. The use of reserves is a cost-effective method that also supports the flexibility of personnel management, which is key for modern military structures.

The analysis of recommendations for optimising the human resources policy of the Ukrainian defence sector highlights the role of adaptability and effective resource management in an active conflict. Flexible recruitment programmes, professional development, and psychological support are key to the stability and combat readiness of personnel, as well as to optimising costs by engaging

civilian specialists and reservists for support functions (Ponomarenko & Pysarchuk, 2024).

The study by B. Kormych *et al.* (2024) on humanitarian corridors in the Black Sea confirmed the significance of stable and competent personnel for flexible protection strategies. This is in line with recommendations for the adaptability of Ukraine's human resources policy. N. Kostyuk & A. Brantly (2022) emphasised the need for technological readiness, which supports proposals to train the Ukrainian military to work with the latest technologies. The psychological support described by K. Kravchenko *et al.* (2023), is vital to reduce personnel turnover and maintain military morale. Proposals for social and psychological care will contribute to the resilience of personnel.

Thus, the developed recommendations are consistent with the findings of other researchers and emphasise the value of an integrated approach to human resources policy in the defence sector, focused on long-term stability and flexibility in the use of resources.

Conclusions

The study highlighted the role of human resources policy in the armed forces as one of the key factors of economic efficiency and stability of the defence sector. Based on the analysis, the effectiveness of human resources policy largely depends on several key factors. Career planning, selection standards, professional development systems, social support, and the introduction of technology ensure both cost savings and the maintenance of a strong professionalism of military personnel. In summary, the analysis confirmed that human resources policy forms an integral part of the economic efficiency of the armed forces.

A comparative analysis of human resources management models in the armed forces of different countries showed that the choice of a particular model depends on the strategic goals and economic capabilities of the defence sector. Contract recruitment, long-term planning, short-term training programmes, rotational models, and hybrid approaches demonstrate distinct levels of cost-effectiveness. Countries with greater financial resources (such as the United States, the United Kingdom, and France) can afford long-term workforce development strategies, while countries with limited budgets prefer short-term and hybrid approaches. Specifically, Sweden and Norway are focused on territorial defence, which is reinforced by Sweden's accession to NATO. Israel stands out for its innovations in cybersecurity and missile defence, while India and Pakistan are developing nuclear capabilities while modernising their armed forces.

It is recommended to introduce flexible recruitment programmes that enable both short-term contractors and civilian specialists to perform non-critical functions. This approach helps to concentrate resources on core defence tasks and reduces the cost of supporting support roles. An essential area is the technological training of personnel, which enables the military to use modern equipment more efficiently and helps to save on maintenance.

For Ukraine, which is in the midst of an active military conflict, an adaptive approach to human resources policy is particularly important. Flexible recruitment programmes and the use of reservists can help respond quickly to changes. Developing the technological skills of the military will help to ensure efficient use of equipment, which is critical to reducing maintenance costs on a tight budget. Social support, such as psychological care programmes, boosts morale and helps to reduce staff turnover, which helps to maintain combat readiness.

However, the study had certain limitations: the dependence of the findings on the availability of modern programmes and technologies, as well as on financial resources for their implementation. Further research can be aimed at exploring concrete methods of adapting the recommendations to conditions with a limited

budget, which will expand the possibilities of using these recommendations.

The proposed recommendations can increase the economic efficiency of the armed forces by reducing personnel costs, maintaining their combat capability, and adapting the personnel structure to the rapidly changing conditions of the modern defence environment. Implementation of such approaches will contribute to the efficient use of resources in the armed forces, increase their readiness and long-term sustainability of the defence sector.

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Conflict of Interest

None.

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Кадрова політика та оборонна економіка: взаємозв'язок між ефективністю та витратами у збройних силах

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Анотація. Метою цього дослідження було вивчення впливу кадрової політики на економічну ефективність збройних сил з акцентом на оптимізацію витрат і боєготовність. У дослідженні проаналізовано моделі управління людськими ресурсами, включаючи набір за контрактом, довгострокове кадрове планування, короткострокові навчальні програми і ротацію, та їхній вплив на економічні показники збройних сил таких країн, як США, Велика Британія, Німеччина, Швеція, Канада, Австралія, Ізраїль, Франція, Італія, Іспанія, Індія, Румунія, Пакистан, Норвегія та Україна. Крім того, було проведено порівняльний аналіз оборонного сектору цих країн, з особливим акцентом на кадрову політику українського оборонного сектору. У дослідженні також було проведено SWOT-аналіз цих моделей, який допоміг оцінити їхні сильні та слабкі сторони, можливості та загрози для економічної ефективності оборонного сектору. Зокрема, контрактний набір забезпечує гнучкість у кадровому забезпеченні, але може призвести до низької лояльності персоналу, тоді як довгострокове кадрове планування сприяє стабільності, але вимагає значних інвестицій. Результати дослідження показали, що ефективне планування кар'єри, високі стандарти відбору персоналу, регулярне навчання та соціальна підтримка є ключовими факторами, які сприяють оптимізації витрат і стабільності персоналу. Крім того, інтеграція технологічної підготовки підвищує ефективність використання ресурсів та зменшує витрати на утримання. SWOT-аналіз показав, що гібридна модель, яка поєднує елементи різних підходів, забезпечує адаптивність у кризових ситуаціях, але вимагає ретельного управління через неоднорідність робочої сили. На основі отриманих результатів у дослідженні запропоновано рекомендації щодо оптимізації кадрової політики з метою підвищення економічної ефективності збройних сил, зокрема через гнучкі програми рекрутингу, використання цивільних фахівців на некритичних посадах та залучення резервістів для виконання допоміжних завдань у кризових умовах, з детальним аналізом їх імплементації в українському оборонному секторі. Отримані результати підтверджують, що збалансована кадрова політика дозволяє підтримувати боєготовність при одночасному зниженні загальних витрат на оборонний сектор.

Ключові слова: військові ресурси; національна безпека; управління персоналом в армії; сектор безпеки; фінансування армії