
Air Force NCOs Competency Profile in the Future Operational Environment

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Abstract:

Purpose: The article aims to identify a profile of NCOs competencies ensuring the functioning of the Polish Air Force in the context of anticipated changes in the operational environment.

Design/Methodology/Approach: The analysis of quantitative empirical material (303 questionnaires performed among NCOs) concerning the structure of competencies required in the future operational environment.

Findings: Based on a set of diagnostic variables (potential indicators of competencies, here - 53 characteristics), a new set of 9 variables was created to express the relationships between the observed variables.

Practical implications: A developed competency profile may be used to design a study program and thus will improve the educational system, will be helpful to evaluate the NCO. The model may help in implementing changes to use the employees' competencies effectively.

Originality/Value: It is complete research for determining the structure of NCO competencies suitable for the future operational environment.

Keywords: Competencies, competency profile, defence, operational environment, NCOs.

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1. Introduction

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Competencies have become a subject of special attention in contemporary management. The issues of identifying and shaping the desired competencies at the organisation's level concerning individual job positions in operational, tactical, and strategic dimensions, and individual employees, are complex and multifaceted (Oleksyn, 2006). In a broad sense, all organisation's activities are always based on the competencies of the people employed. Identifying those competencies that will enable the organisation to carry out tasks consistent with its goals and strategy is fundamental.

It is possible through the construction of competency models and profiles, and their implementation. Competency modelling is a set of activities aimed at developing a useful profile or pattern of competencies as a set of characteristics, which an employee should have to effectively perform their professional duties (Steward, Brown, 2009; Hys, 2014). It defines the competencies required to perform a specific job or organisational roles (Fogg, 1999). A competency model should contain a set (list and descriptions) of all competencies that an organisation considers necessary to implement its strategy and achieve its goals and succeed in its business (Szczepańska-Woszczyna, 2018).

Even though the issues concerning creating and using competency profiles and models in the literature mainly refer to enterprises, they can be successfully applied to other organisations, including the Armed Forces (meant as forces and resources allocated by the state to protect its interests and conduct armed struggle and defense, included in an organizational whole, consisting of various types of troops and services). Nonetheless, in practice, a certain dissimilarity to the one used in economic organisations can be observed. In economic entities, the environment they operate in is shaped by the laws of supply and demand and the competition caused by these phenomena.

However, for public institutions such as the Armed Forces, which will conduct their operations in a hazardous and hostile environment, adaptation, and response to changes in the environment are particularly critical. Personnel constitute the most significant capital for any organisation, and their training and maintenance consumes considerable financial resources and time.

Hence, competence modelling becomes a valuable tool, enabling not only to achieve the desired effects in managing the organisation's resources but also increasing the likelihood of achieving the set goals.

The purpose of this paper is to identify a competency profile for NCOs ensuring functioning of the Air Force as a part of the Polish Armed Forces in the context of anticipated changes in the operational environment.

2. Concept of Competencies

Competencies can be understood as a set of individual knowledge, skills, and traits that allow performing tasks effectively and achieving objectives on a given job position and the context of the organisation's strategic objectives, motivation to act, and responsibility. Competencies can be referred both to the job position and to the person performing the job at that position (Szczepańska-Woszczyzna, 2021).

Approaches to defining the concept of competencies refer to two scopes; the first one is "competence" as a functional approach, which refers to the ability to achieve minimum standards of pursued goals, and the other is "competency" that means a behavioural approach referring to the employee's behaviour that enables him/her to achieve high work performance (Rowe, 1995).

Moreover, two currents can be observed in defining the notion of competence: the first of them is the definitions relating competencies directly to the person they concern, thus defining the scope of knowledge, skills or responsibility or authority to act, identifying them with a set of behaviours that some people master better than others, thanks to which they act more efficiently in a given situation, as well as with abilities, interests, personality traits, as parameters that differentiate individuals among themselves.

The second stream is definitions that relate this concept to the job or position held and treat competencies as performing a function in an organisation (Stuss *et al.*, 2019). Thus, the contemporary perception and interpretation of work competencies requires a holistic approach that takes the ideas found in both streams into account.

The competencies required in professional work are both conceptual (e.g., cognitive, knowledge and understanding) and operational (e.g., functional, psychomotor and application skills). Competencies related to individual performance include conceptual (meta-competencies, learning ability) as well as operational ones (social competencies including behaviour and attitudes) (Le Deist and Winterton, 2005).

The components of competency comprise knowledge, skills, specific standards of behaviour, ethical values, and enthusiasm, dependent on individual predispositions, extremely difficult to learn and critical to task performance (Spencer Jr and Spencer, 1993). Authors dealing with competence issues mention that the essential components of competence are knowledge and skills. Knowledge (general, theoretical, specialized) includes everything that an employee has learned both during the formal education process (school, studies), as well as in the framework of self-education.

On the other hand, practical skills (technical, technological, professional) refer to what an employee can do (often identified with experience and/or ability to act). Attitudes and behaviours (the latter expected in the workplace) are also among the components of competencies. Besides, motivation is mentioned as such (Spencer Jr and Spencer, 1993; McLagan, 1997; Levy-Leboyer, 1996; Knecht and Rzepecka, 2020). Cheetham

and Chivers (1996) distinguish cognitive, functional, personal, ethical, and meta-competencies. McLagan (1997) lists task, result-oriented, and output competencies, knowledge, skills, and attitudes as a behavioural component of competencies, conceptual and operational competencies, and others.

In the Polish Armed Forces, there are many processes identical to other organisations. One of them is the functional area of human resources management, which comprises recruitment, selection, training, and evaluation of personnel resources. As in the case of other organisations, personnel are the greatest asset of the Armed Forces and their competencies can and should be analysed and modelled.

3. Changes in the Environment of the Armed Forces as a Determinant of Competence Needs

Changes taking place in the security environment of Poland and the Polish Armed Forces as an organisation should also translate into changes in HR management processes. According to the American doctrinal document such as Joint Operating Environment JOE 2035, the future security environment will be defined by two key challenges. The first one is the contested norms of international law on the part of various state and informal actors. The other one is the persistent disorder, where there is no strong state authority to ensure the stable functioning of societies (Joint Operating Environment 2035).

All the above takes place in the context of various trends occurring in the spheres of international order, global demography, and technological development linked to the widespread availability of advanced technological solutions. Hence, the future operational environment of the Air Force will be determined by high dynamics of change, unpredictability, complexity, and multidimensionality. Accordingly, the American doctrinal document presenting the Air Force Future Operating Concept (AFOC) introduces the concept of "operational agility", namely, operational mobility ensuring adaptation to changing conditions rapidly. "Operational agility is the ability to rapidly generate - and shift among - multiple solutions for a given challenge.

This agility will require Airmen to change the way they think about seizing and retaining the initiative in conflict" (Air Force Future Operating Concept). Under the AFOC, the future operating environment will force the Air Force to develop the following capabilities: the ability to conduct integrated, combined air, land, maritime, and cyberspace operations; the ability to develop rapid decisions in an environment of incomplete information; the ability to dynamically command/manage the resources at hand; the ability to select resources to accomplish a task sustainably; and the ability to improve task force effectiveness.

The aspect of technological progress will also be imperative. It will force network-centricity and deep integration of the individual elements of the defence system. For example, conceptual work on changing the existing AOC (Air Operations Centre) command posts to the future MDOC (Multi-Domain Operations Centre) can be given.

The MDOC concept is based on institution of a command post enabling synergic synchronisation of operations of the Air Force and other branches of armed forces, including cyberspace operations. The above conditions will pose entirely new challenges to the environment of NCOs of the Polish Air Force and will enforce adaptation, which should enable effective operations.

The NCO Corps'role will be significantly expanded. It will constitute the real foundation of the defence system. Without a complete understanding of the relationships between the links in the system, the ability to quickly adapt, integrate, and create task forces outside of rigid structures at the NCO level will lose its ability to operate effectively. There will also be an increase in the NCOs'role as true leaders with greater autonomy and proportionately greater responsibility. The future NCO group must be equipped with a new, clear, and coherent vision for operation of the Air Forces, compatible with the model used in leading allied armed forces. They must be equipped with the competencies to perform leadership roles and a high degree of operational autonomy in the Mission Command model of centralised command and decentralised task execution.

4. Competency Models in the Armed Forces as an Organisation

The described operational environment and the achievement of the required capability of the Air Force to operate effectively will have to influence how it manages, particularly, the personnel pool of NCOs. The proper functioning of this group will require the development of a competency model, which is currently not fully defined. In the case of NCO personnel resource, the most advanced solutions in the competency model were developed in the USA and constitute a model for many leading armies.

According to US doctrinal findings, "NCOs/POs possess professional qualities, competencies, and traits that complement the officer corps and enable the enlisted force. They are trusted and empowered leaders in the Profession of Arms - the Backbone of the Armed Forces" (The Non-commissioned Officer, 2014). Another doctrinal document on the US non-commissioned officer corps - AFI 36-2618 "The Enlisted Force Structure" - speaks of a common approach to education, professional development, and career progression based on "institutional competencies", primarily including leadership, managerial competencies, and service ethos. The competencies are intended to be the same to all NCOs regardless of the diversity of function or position and treated as generic competencies (AFI 36-2618). The approach to NCOs in Poland is in line with current NATO trends.

In the current model of functioning of the corps of professional non-commissioned officers, one can notice a gap in the definition and description of required competencies. That model is mainly based on rigid criteria concerning the possession of a non-commissioned officer's appropriate general education, specialised courses,

state of health and physical fitness, and periodic opinions are conducted so far based on a simplified questionnaire, which is standard for all positions.

One of the attempts to identify the required competencies was a study conducted in 2014 by the Military Social Research Bureau on "Social competencies of the Polish Armed Forces command staff in the context of performing official tasks" (Predel and Łatacz, 2014), which included surveying social competencies such as leadership, cooperation, communication, influence, and negotiation and handling difficult situations. Studies conducted by WBBS indicate that the military environment sees the need to develop competencies and identify the most significant ones; in the study conducted by M. Baran-Wojtachno entitled "Assessment of the Professional Preparation of Polish Armed Forces Officers", respondents answered the question about determining, based on their own experience, fundamental knowledge, and skills in the service of a Polish Armed Forces officer.

Comparison of the results of the surveys allows defining a set of shared competencies considered by the respondents to be crucial in military service as follows: specialist knowledge related to the position held; technical knowledge and skills (equipment operation); physical fitness; general military knowledge; English language skills; knowledge of military property management; knowledge of NATO procedures, preparation for service outside the country; mental resilience. The listed competencies are perceived necessary in the functioning of each soldier, regardless of the personal corps or function held.

5. Materials and Methods

The research on the competency profile of non-commissioned officer cadres of the Polish Air Forces was conducted in 2020. General population size (N) was about 10k, significance level 5%. Questionnaires were sent to randomly chosen 352 professional soldiers in different professional corps (Armed Forces General Command, The 1st and 2nd Tactical Aviation Wings Command, Mobile Air Force Command Unit, 31st and 32nd Tactical Air Base, 33. Transport Aviation Base, Air Force Training Center, Air Force NCO Academy). Correctly completed questionnaires were received from 303 people, which made it possible to obtain a return rate of 86%.

Assessment of competencies included the dimension of knowledge (K), skills (S), and attitudes (A). An exploratory factor analysis (EFA) was used to perform a multidimensional analysis of NCO competencies. That enabled assessing the homogeneity of the scale for measuring competencies. Evaluation of correlation for the whole set of variables was made using KMO (Kaiser-Mayer-Olkin measure) - the value of this measure above 0.5 is considered a threshold (if $KMO > 0.5$, the adopted set of variables is considered good; the maximum can reach 1). The method of principal components, an adaptation of the classical Hotelling method of principal components for factor analysis, was used to extract the common variability.

In the effect of applying the principal components method, a component matrix containing factor loadings as a measure of the association between a given diagnostic variable and a given factor was constructed. The matrix is usually rotated. It aims to zero or at least minimise one of the charges so that the observed variable is shaped by only one factor. There are many rotation methods, and their essence boils down to a rotation of the system of factor axes. There are two groups of factor rotation methods: orthogonal (e.g., Varimax, Quartimax, Equamax), which assume independence of factors, and oblique (eg. Oblimin and Promax), with the correlation between factors. In this case, due to the assumed correlation of competency subscales (dimensions) (Table 1), a Promax oblique rotation with $\kappa = 4$ was applied.

6. Results and Findings

Based on the proposed set of diagnostic variables identified based on the literature analysis (53 characteristics), treated as potential competency indicators, groups of these variables (the so-called factors) can be identified. A new set of variables is created, less numerous than the initial set, which expresses the relationships between the observed variables. Table 1 presents the values of factor loadings after Promax rotation. Specific diagnostic variables are grouped into subcategories (subscales) based on factor loadings (associated with the factor for which a given variable has the highest factor loadings).

These factors are marked in Table 1 in bold font and the appropriate background colour. Notably, the diagnostic variables were categorised into factors according to their division into knowledge (K), skill (S), and attitude (A) domains. The variables from each subgroup were distributed among nine factors, and within each factor, only variables from a given competency dimension were included. It confirms the preconceived assumptions regarding the measurement of knowledge, skills, and attitudes of non-commissioned officers of the Polish Armed Forces.

Table 1. Results of exploratory factor analysis and assessment of reliability of competency measurement.

Specification (S – Skills; K – knowledge, A – attitude)	Subscale								
	1	2	3	4	5	6	7	8	9
(A48) Adherence to soldier values and ethos	0,966	0,069	0,031	-0,087	-0,165	-0,001	0,016	0,020	0,043
(A47) Respect for the military hierarchy	0,872	-0,109	0,144	0,068	-0,137	-0,017	-0,075	0,144	0,008
(A49) Care for equipment and property	0,798	0,154	0,039	-0,119	-0,082	0,102	-0,028	-0,136	0,006
(A50) Personal culture Building a positive image of the NCO	0,766	-0,023	-0,068	-0,218	0,059	0,221	-0,038	0,173	0,014
(A52) Goal orientation	0,581	0,188	-0,153	0,091	0,201	-0,186	0,200	0,141	0,075
(A45) Compliance with regulations, norms, rules	0,565	-0,241	0,108	0,332	0,055	-0,094	-0,028	0,094	-0,041

(A36) Care for subordinates	0,551	0,146	-0,105	-0,080	0,375	-0,036	-0,021	-0,109	-0,095
(A51) Physical fitness	0,546	-0,062	-0,079	0,456	-0,166	-0,137	0,063	0,322	0,057
(A35) Honesty	0,509	0,049	0,013	-0,056	0,274	0,060	-0,075	-0,166	-0,087
(S14) Risk estimation	0,112	0,803	0,125	-0,048	-0,098	-0,053	0,029	-0,228	-0,143
(S15) Critical thinking	-0,103	0,759	0,013	0,086	0,129	-0,057	0,021	-0,223	0,259
(S13) Action planning	0,066	0,627	0,163	-0,020	-0,100	0,149	0,008	-0,046	-0,151
(S25) Ability to function in a diverse, multi-domain environment	0,017	0,520	-0,065	0,191	0,097	0,027	-0,069	0,128	-0,129
(S16) Leading	-0,093	0,499	0,013	-0,007	0,075	0,396	-0,015	0,026	0,170
(S27) Formulate of vision	-0,021	0,481	0,108	0,206	0,214	-0,098	-0,070	0,147	-0,093
(K8) Knowledge of structures and relationships in the Armed Forces	0,107	-0,116	0,863	-0,083	0,046	0,102	-0,046	-0,020	0,265
(K7) Knowledge of national security	0,114	-0,084	0,807	-0,130	-0,046	0,028	0,056	-0,047	0,085
(K9) Knowledge of tactics / techniques and procedures (TTP)	0,057	0,111	0,733	0,001	-0,059	0,062	-0,008	-0,062	0,170
(K12) Basic knowledge of principles of operation of other armed formations	-0,068	0,247	0,708	0,007	0,011	-0,182	-0,100	0,183	0,087
(K11) Knowledge of combined operations	-0,096	0,281	0,703	0,246	-0,020	-0,305	-0,019	0,026	0,019
(K10) Knowledge of specialised software	0,000	0,049	0,516	0,202	-0,245	0,068	0,071	0,271	-0,057
(S30) Efficiency in achieving results	-0,119	0,001	0,017	0,858	0,065	-0,050	0,027	0,175	0,114
(S28) Draw and communicate conclusions	0,010	0,204	0,068	0,717	0,078	-0,219	0,026	0,014	-0,036
(S23) Precision of intention	0,087	0,290	-0,099	0,611	-0,033	-0,047	0,066	0,070	-0,139
(S31) Self-management	0,158	0,160	-0,086	0,598	-0,097	0,082	-0,005	0,150	-0,012
(S34) Quality and timeliness of performance	-0,023	-0,195	0,128	0,465	0,194	0,259	0,061	-0,094	0,040
(S24) Evaluation of task performance	0,127	0,303	-0,071	0,400	0,063	0,065	-0,033	0,043	-0,153
(A40) Courage to express opinions	0,013	0,115	-0,063	0,047	0,804	-0,117	-0,078	-0,089	0,086
(A39) Innovation	0,130	0,157	0,025	-0,036	0,731	-0,096	0,000	0,034	0,046
(A37) Openness to change	0,190	-0,108	-0,075	0,020	0,668	0,022	0,070	0,150	0,218
(A38) Adaptability	0,220	-0,093	-0,085	0,058	0,642	0,040	0,032	0,090	0,039
(A46) Self-development	0,344	0,048	0,029	0,044	0,441	-0,011	0,110	0,058	0,131
(A42) Independence and initiative	0,306	0,108	0,021	0,049	0,419	0,034	-0,072	-0,071	-0,168
(S19) Communication	0,109	-0,002	-0,066	-0,109	-0,098	0,969	0,013	0,222	0,111
(S18) Teamwork	0,008	0,092	-0,097	0,097	-0,038	0,757	0,103	0,025	0,146
(S26) Ease of contact	0,115	0,223	0,077	-0,086	-0,066	0,652	-0,115	0,235	0,084
(S20) Negotiation skills	0,027	0,360	-0,043	-0,200	0,024	0,577	-0,026	0,463	-0,053
(K4) Specific English	-0,023	-0,017	-0,117	0,151	-0,103	0,054	0,903	-0,069	-0,100
(K3) General English	-0,010	-0,057	-0,030	0,081	0,016	0,119	0,813	-0,103	0,066

(K5) Knowledge of other foreign languages	-0,042	0,018	0,198	-0,193	0,248	-0,209	0,645	0,186	-0,069
(K6) Specialised entitlements	0,182	0,154	0,068	0,103	-0,361	0,265	0,510	-0,336	-0,027
(K2) Technical knowledge at tertiary level	-0,121	-0,006	0,217	-0,277	0,118	0,020	0,482	0,265	-0,291
(S29) Operation of office machinery and equipment	0,096	-0,159	0,071	0,374	-0,022	0,173	-0,059	0,733	-0,004
(S32) Administration / record keeping	-0,007	-0,219	0,119	0,457	-0,045	0,226	-0,076	0,523	-0,321
(K1) General knowledge at secondary level	0,033	-0,060	0,285	-0,003	0,181	0,260	-0,085	-0,051	0,733
KMO and Bartlett's test of sphericity	0,942; $\chi^2(1378) = 11156,6; p < 0,001$								
Percentage of explained variance.	35,50	8,09	3,91	3,56	3,03	2,75	2,16	2,02	1,97
Cumulative % of explained variance.	35,50	43,60	47,51	51,06	54,09	56,84	59,00	61,02	62,98
Cronbach's alpha	0,931	0,839	0,850	0,903	0,878	0,796	0,766	0,720	x
Spearman-Brown coeffic.	0,900	0,809	0,792	0,890	0,860	0,765	0,799	0,721	x
Guttman split-half coeffic.	0,891	0,808	0,792	0,865	0,859	0,751	0,719	0,720	x

Source: Own research of the Polish Air Force NCOs ($n = 303$).

In this study, the main factor can be defined as the professional attitudes of the soldier of the Polish Armed Forces. It explains about 35% of the variation in the latent variable (percentage of explained variance – Table 1). The subscale of competency includes the following components of attitudes (in order of their importance for measuring competence): perception of values and ethos of a soldier of the Polish Armed Forces, perception of the military hierarchy, care for equipment and property, personal culture, building a positive image of an NCO, goal orientation, adherence to regulations, norms and rules, care for subordinates, care for physical fitness, and honesty (omitted: availability, responsibility, and stress resistance).

The variable created based on the mentioned components was determined as the arithmetic means of the assessments made concerning these ten components. The reliability of this variable is very high - the Cronbach's coefficient alpha is 0.931, and the half reliability assessment coefficients (Spearman-Brown coefficient and Guttman half reliability coefficient) confirm the good metric properties of this scale (close to 0.9).

The second group explains about 8% of the variation in the latent variable. It can be defined as **command skills**. The measurement reliability is high (Cronbach's alpha reaches 0.839). The third group includes variables from the Knowledge area and can be defined as **professional knowledge in the military area**. It explains about 4% of the variation in the competencies. It is characterised by high reliability (Cronbach's alpha reaches 0.850).

The next group includes **managerial skills**. The factor explains 3.56% of the variation in the competencies. The reliability of the variable is high - Cronbach's alpha is at the level of 0.903. Also, the half reliability coefficients have high values. The fifth factor includes '**meta-attitudes**'. The group explains 3% of the variation in the latent variable, and the reliability of the synthetic variable is also high (Cronbach's alpha is 0.878). The sixth factor includes **social skills**.

The degree of explanation of the variance of the latent variable is small (2.75%); nevertheless, the reliability of the measurement is also high. In this case, Cronbach's coefficient alpha is 0.796. The next group includes **general knowledge (outside the military area)**. The synthetic variable has high reliability, with Cronbach's coefficient alpha equal to 0.766. The last two groups are very narrow. The first one concerns administrative skills.

Despite the small number of components, the synthetic variable has good metrics since the coefficient of Cronbach's alpha, and measures of half reliability exceed 0.7. The last factor includes only one variable - general knowledge at the secondary level. This component shows weak relationships relative to the other questions in the knowledge domain. Analysing the values of the factor loadings, one finds confirmation that this component stands out from the others, not being related to any of the other factors. The other synthetic variables were determined as an average for the individual factors and thus also took values 1 - 5, while the last variable was analysed separately.

Analysing the importance of individual groups of competencies in NCO work indicated by the respondents, it can be noticed that within the competencies concerning military, attitudes are of the most considerable significance, followed by skills, and the least vital is knowledge. Management skills, "meta-attitudes", and social skills are also of equal importance to professional attitudes; administrative skills and general knowledge from secondary school are of lesser significance. The importance of general knowledge was rated lowest.

The results discussed above also translate into an overall assessment of the importance of knowledge (K), skills (S) and attitudes (A). Each of these variables has good metric properties - Cronbach's coefficient alpha is at the level of: for *K* - 0.830, for *S* - 0.937, for *A* - 0.949 (a high level for alpha may mean that the items in the test are highly correlated, for $\alpha \geq 0.9$ the internal consistency is excellent, for $0.9 \geq \alpha \geq 0.8$ good, for $0.8 \geq \alpha \geq 0.7$ acceptable).

7. Summary and Concluding Comments

The authors' research results and the analysis of the theory on employee competencies indicate a need to further develop the knowledge on competency modelling in the Armed Forces. In the NCO corps, it will be critical to identify the profile of general competencies required of everyone in this group and methodically describe the profiles of specific competencies in characteristic (homogeneous) groups of positions.

It is worth remembering that, under the Regulation of the Ministry of Defence of March 24, 2017, on personnel corps, personnel groups, and military specialities of soldiers in active military service, as many as 65 NCO specialities are distinguished in the Polish Air Force alone. Given the above, it seems that in the Polish Air Force case, it is necessary to divide the model of competencies into three homogeneous functional groups: technical, operational, and logistic.

In each of these groups, there will be different competencies of varying intensity. Such a division would enable sufficiently precise identification and description of competencies while maintaining the transparency and functionality of the entire competency model. The above considerations allow the conclusion that introducing the NCO competency profile in the Air Force will enable better functioning of this organisation and effectively respond to the requirements of the dynamically changing environment.

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