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CHAPTER 7

Evolution of Development Centres in the Military Sector – from Beginnings to Game Changers

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Abstract: The article presents the results of the review of literature and source materials (military and civilian), the purpose of which was to determine: diagnosed competencies, applied methods of diagnosis and their effectiveness using Assessment/Development Centres. The study covered materials from 1920 to 1974, including declassified documents from experiments carried out in the German, British, Danish and American armies. The obtained results were confronted with selected methods of officer development currently used in the Polish army. It was found out that the centre are mainly used in working with officers, and the subject of the diagnosis is primarily leadership competencies (defined by the performance dimension). Since the 70s of the 20th century the basic principles of the organization of the centres have not changed, namely the multidimensionality of the research, the complexity of the tools used and the collectivism of the assessment. Game changers in this field are the tools and forms of carrying out individual elements of assessment; solutions related to computerization, virtualization and neurodiversity are being implemented, examples of which are described in this study.

Keywords: Assessment Centres, Development Centres, military training

7.1. Introduction

The use of development centres is still very popular among specialists in human capital management, both in the civil and military sectors. Although this method is time--consuming and cost-intensive, it has an advantage over other diagnostic methods due to the comprehensiveness and accuracy of the assessment (Cumberland et al., 2016). Of course, this happens when certain procedures for organizing this research are met (Juchnowicz, 2014). In the literature on the subject, it is often emphasized that the methods and tools of assessment centres and development centres come from the army, especially in diagnosing leadership competencies that are crucial for the indicated sector. However, the question arises whether the conclusions from the research that was conducted among soldiers actually became the foundation of AC/DC used in business? In addition, it is worth analysing whether AC/DC tools currently used in the military sector can still be an inspiration for business entities.

The article presents the results of the study of source materials (military and civilian), the purpose of which was to determine: diagnosed competences, used methods of diagnosis and their effectiveness. The study covered materials from 1920 to 1974, including declassified documents from experiments carried out in the German, British, Danish and American armies. The obtained results were confronted with selected methods of officer development currently used in the Polish army. Recommendations for the implementation of game changers (modern training solutions with the use of simulators and devices enabling training) in Extended and Augmented Reality were also formulated.

7.2. Theoretical Foundations – Current State

Currently, assessment and development centres are defined as multidimensional processes of assessing the competences of selected people by independent and objective assessors, where assessment centres support the selection of optimal candidates for positions (recruitment and selection function), and development centres initiate employee development processes (Juchnowicz, 2014, p. 378). Therefore, it is a diagnostic method that, performed on the basis of defined competence criteria, allows for the assessment of specific behaviours in situations similar to real ones. Based on the guidelines of the International Assessment Centre Task Force, it should also be assumed that an assessment centre consists of a standardized evaluation of behaviour based on multiple inputs; any single assessment centre consists of multiple components, which include behavioural simulation exercises, within which multiple trained assessors observe and record behaviours, classify them according to the behavioural constructs of interest, and (either individually or collectively) rate (either individual or pooled) behaviours. Moreover, using either a consensus meeting among assessors or statistical aggregation, assessment scores are derived that represent an

assessee's standing on the behavioural constructs and/or an aggregated overall assessment rating (OAR) (Guidelines…, 2015). The key elements of AC/DC include: 1) Systematic Analysis to Determine Job-Relevant Behavioural Constructs; 2) Behavioral Classification; 3) Multiple Assessment Centre Components; 4) Linkages Between Behavioural Constructs and Assessment Centre Components; 5) Simulation Exercises; 6) Assessors; 7) Assessor Training; 8) Recording and Scoring of Behaviours; 9) Data Integration; 10) Standardization (Guidelines…, 2015).

The most common AC/DC tasks include:

a) in-basket/in-tray – through which analytical skills, prioritization, task delegation, work organization, decision-making, stress resistance, time management are diagnosed;
b) group discussion – through which competences in the field of interpersonal communication, persuasion and cooperation skills, decision-making, negotiation and leadership skills, and emotional control are diagnosed;
c) role-playing – through which competences in the field of interpersonal communication, persuasion and cooperation skills, decision-making, negotiation skills and team management are diagnosed;
d) case study – through which analytical skills, decision making, persuasion skills, creativity and expert knowledge are diagnosed;
e) presentations – through which competences in the field of communication, search, synthesis and graphic presentation of information, the ability to convince and engage recipients are diagnosed (Trochim, 2019).

An important issue undertaken by researchers is the approach to testing the validity of the method itself, which is the centres. For this purpose, various criteria are used, such as: objectivity, standardization, normalization and reliability. One of the examples of the conducted analysis is, e.g., a statistical measure of the predictive value using the Pearson correlation coefficient; for AC/DC, the researchers obtained a score in the range of 0.41–0.65, which is the highest for all selection methods covered by the study (Kawka & Listwan, 2010).

7.3. Research Methodology

To compare the current state with the original assumptions of AC/DC developed in the military sector, a qualitative study of source materials was carried out. The study covered the literature on the subject and declassified, selected documentation of experiments carried out in the German, British, Danish and American armies. The following research questions were formulated: 1) what competencies were tested within DC; 2) what methods were used within DC; 3) what was the accuracy of the techniques and tools used; 4) which techniques and tools can be used in modern DC in the military sector? The article presents a selected fragment of the study, in which the key results of the analyses were indicated.

7.4. Research Results – Identification of Key Stages of AC/DC Development in the Military Sector

In 1920, Johann Baptist Rieffert founded, on behalf of the Reichswehr Ministry, a centre for psychological research at the University of Berlin. The main task of the centre was to improve the methods of selecting candidates for officers of the German army. In the years 1922––1931, Rieffert headed the Department of Military Psychology, during which time he not only developed the procedure with entrance tests for the AC, but also built the psychological service of the Reichswehr. The theoretical foundations of Rieffert's method should be sought in the mainstream of holistic psychologists, Gestalt theory and the works of Kurt Lewin, including those on test research, group dynamics and sensitivity training. In 1926, Rieffert introduced the "Round Table" as part of the officer selection process, which to this day is one of the standard building blocks of the AC (under the term "group discussion"). In 1927, participation in this first form of AC was compulsory for all officer candidates. The following procedures that were used as part of the Wehrmacht selection process are also mentioned:

- biography analysis (the aim of the measurement was biographical data that could have an impact on mental and spiritual development, for example travels);
- expression analysis (the aim of the measurement was forms of "mental expression without a conscious order of purpose and without the participation of consciousness"; the following methods were used: analysis of facial expressions, pantomime, forms of speech and language, written analysis);
- mental analysis (e.g., arithmetic tasks, tests and essays on technical videos, followed by exploration);
- performance analysis (testing reactions on apparatus, sports tasks and "series of commands", i.e., the examinee had to follow instructions, but the manner of execution was largely his invention);
- leader test (solving tasks together with subordinate soldiers, and thus analysing expression, mind and action);
- final test (the aim of the measurement was: behaviour in a familiar community; the method of controversial discussion among the examinees was used) (Simoneit, 1933, pp. 46–57).

The course of the above Wehrmacht selection procedure was such that two examination groups with four participants were assessed by observers. The selection committee consisted of permanent members of the examination centre, the commander of the examination centre as a chairman, several psychologists, two officers from the armed forces and a medical officer (psychiatrist). The selection process took three days. During this time, branch officers were tasked with supervising participants also outside of exams. Together with the test procedure, a comprehensive picture of the test person could be created and evaluated. After the observation was completed, the candidates were informed of the result by the

Army Personnel Office. At its peak in 1936, approximately 40,000 candidates were screened at 15 military psychological centres (Obermann Consulting, 2022).

Another representative of German precursors was Max Simoneit. He started his work with Rieffert. He believed that the psychological diagnosis of candidates for officers and specialists should be the main focus of military psychology. He used qualitative assessments more often than quantitative, and subjective rather than objective (Burt, 1942). Simoneit (1933) believed that an officer candidate must be observed in action to judge his complete character. The key trait he studied was the candidate's willpower. He developed, among others, tests such as obstacle courses that could not be completed; candidates repeatedly climbed inclines until they were exhausted (Harrell & Churchill, 1941). These tests were accompanied by diagnoses of facial expressions, handwriting, and leadership roles. Simoneit's methods were seen as innovative, and the use of multiple and unconventional assessment methods inspired officer selection practices in Australia, the United Kingdom, and the United States (Highhouse, 2002).

The representative of the British AC school was, e.g., Wilfred Ruprecht Bion. He specialized in group dynamics (Bion, 1959). The British War Officer Selection Board used a procedure in which psychiatrists interviewed officer candidates and psychologists conducted a series of tests. This procedure has raised many questions about the weight to be given to psychiatric and psychological conclusions. Bion replaced this process with a series of leaderless group situations to explore the interplay of individual personalities in a social situation. Bion believed that creating leaderless situations for candidates (e.g., a group carrying a heavy load through a series of obstacles) was an indicator of their capacity for mature social relationships (Sutherland & Fitzpatrick, 1945). He changed priority from individual action to collaboration to complete tasks. The challenge for the candidate was to demonstrate his skills through others (Murray, 1990). Candidates underwent a series of tests and exercises over a period of 2.5 days. Psychiatrists and psychologists worked together as a team of observers to share observations and develop a common impression of each candidate's personality (Highhouse & Kostek, 2013).

At the same time, work was carried out in the United States. The most important person to be named was Henry Murray. He is credited with coining the term AC. In accordance with the holistic approach, Murray developed a theory of personality, also called personology (Murray, 1938). The basis of the theory was the conviction of the need for in-depth, systematic research of individuals. Murray's contributions to the development of AC were multiple; he has introduced methods such as: the idea of task simulation, a structured approach to assessing candidates, and the approach based on the principle of "multi-eyes". Because of his medical background, he was used to discussing patient cases with others in collegiate counselling (Obermann Consulting, 2022). This is how he also educated students in the field of AC. One student (Robert D. Stolorow) recalled that the AC course in Harvard's graduate program in clinical psychology in the late 1960s involved an entire class studying one person for an entire semester using biographical material, clinical interviews, and psychological tests; then the whole class wrote down a common case report (Kovary, 2018). After leaving

Harvard, Murray joined the Office of Strategic Services (OSS), which was established in 1942 and was the predecessor of the Central Intelligence Agency (CIA). The main task of the AC in the OSS was to develop a methodology for selecting people to conduct special operations aimed at destroying the morale of enemy troops, organizing and training resistance groups, and gathering information behind enemy lines. Murray and his team constructed a series of situational tests and "task samples" that required candidates to deal with stresses, conflicts, and problems of the same general nature as in the situations they would later face. The assessment program took three days, during which not only was the candidate's test performance determined, but also his personality as a whole (N., Sam M.S., 2018). One of the main evaluation methods was the so-called intelligence test. The process began by giving each candidate a fictitious name to prevent test colleagues from identifying their service status or civilian background. Afterwards, almost everything he did was recorded, i.e., the way he greeted staff, walked around, behaviour at informal meetings, conversations on topics that revealed his attitudes, goals, prejudices and religious beliefs. Over the course of 3 days, each candidate took a number of written tests, including aptitude tests and projective tests, and completed questionnaires designed to gain information about his life and personality. After analysing, this material was the basis for guiding the course of questions conducted by the examiner during the clinical interview. This part of the process turned out to be one of the most innovative of all procedures. The next stage was a series of "stress interviews", the purpose of which was to determine the extreme level of intellectual and emotional stress that a given person can withstand. The candidate was asked, for example, to come up with a story and then defend it sitting fully upright with a bright light shining in his eyes, fending off a crossfire of questions. To add to the tension, the examiners asked questions and accusations with increasing speed, to the point of constant harassment from all sides. During this task, observers also assessed the candidate's physiological responses, such as blushing, swearing, swallowing, stuttering, and other signs of tension. The next step was to continue the conversation, but under calm conditions, trying to reduce the candidate's vigilance and make him not defend his story. The described interview test allowed the examiners to assess the intellectual resourcefulness, emotional stability and safety awareness of the subjects. The characteristics identified in the interview test were then tested in situational stress tests. An example task ("Test of Walls") was that several candidates had to carry a heavy log of about 2.5 m and themselves through 2 walls (about 2.75 m) separated by a deep, imaginary canyon, also about 2 m wide, 5 m long. No leader was assigned to the group; observers recorded which men took over as leaders and whether leadership changed among the participants. The observations allowed the identification of "natural" leaders and insights into how men interacted with each other. In addition, observers recorded energy levels, initiative and ideas, as well as candidates' reactions when their suggestions were rejected by others. The most frustrating stress test was the construction task which required a human to build an approximately 1.5.m cube from a set of large bricks (the Giant TinketToy) within a given time. The portions were so large that the candidate was given two assistants to assist him, who were actually psychologists secretly trained to annoy him and prevent him

from completing the task. Based on their observations, psychologists made a report on how the candidate handled the situation. After a 3-day assessment session, the examiners exchanged observations, interview and test results to obtain a final score for the candidate (N., Sam M.S., 2018). According to data disclosed by the OSS, a total of 5,391 candidates were examined, of whom 1,187 were assigned to operational activities (OSS Assessment Staff, 1948). At the same time, the book *Assessment of Men: Selection of Personnel for the Office of Strategic Services* (OSS Assessment Staff, 1948) is considered the first work on AC, although the term "centre" is not used in it.

The next stage in the development of the AC/DC methodology can be considered the research conducted in the Danish army in the years 1953–1963. Analysing the report prepared by Meincke (1999), it can be seen that the AC/DC process used in this army is methodologically similar to the method used today. First of all, the basis for the selection of techniques and tools is the competency profile of candidates for officers. The profile distinguishes: undesirable mental disorders, desirable mental health, cognitive abilities and leadership potential. Undesirable mental disorders included: mental distress, adaptation difficulties, irrational/incomprehensible behaviour, unpredictable behaviour, tendency to lose self-control, inappropriate originality and unconventionality, disgusting appearance, and reluctance to comply with rules and standards of behaviour. The recommended mental characteristics were: positive and realistic self-image, goal-oriented behaviour, independence, realistic perception and interpretation, personal development and self--fulfilment, social competence and energy. In the group named "specific personality traits in the officer's profile", 2 subgroups were distinguished, namely:

a) cognitive abilities which include: intellectual ability, knowledge/proficiency, motivation to learn;
b) leadership potential, i.e.: analytical skills, judgment/discernment, wide field of view, initiative, energy, perseverance, flexibility, personal strength, decisiveness, willingness to lead, ability to cooperate, sensitivity to other people/empathy, situational awareness/ attention directed at social environment. ability to communicate, self-confidence, assertiveness, sense of humour, resistance to stress, potential for further personal development.

The AC process was also not accidental; candidates were assessed according to the following procedure: tests of intelligence, skills and knowledge, group exercise without a leader, short psychological interview (30 minutes), long psychological interview (60 minutes), summary meeting at which psychologists come to an agreement on the assessment of candidates, physical fitness, interview with an officer of the military academy, competition committee. Candidates who failed the tests in accordance with the standard (except for the personality test) were excluded from further proceedings. The remaining candidates went to the next stage which was a group exercise without a leader (90 minutes). Each group of 6 candidates was supervised by 3 psychologists. In a group exercise, candidates were assessed on their ability to cooperate, social skills, sensitivity to other people, energy

and initiative. The next stage was psychological interviews: short (30 minutes) – focusing on military experiences, and longer (60 minutes) concerning upbringing, learning, professional experiences, interests, social relations, motivation and professional intentions. Each candidate spoke to 2 psychologists (one in a short interview and the other in a longer interview). The psychologists had access to all test results and information about the candidate. After the interviews, the psychologists discussed each candidate's case among themselves, until a consensus was reached, i.e., whether they fit the officer's profile. The end product of the psychological selection process was a personality description and adequacy assessment, as well as quantitative assessments. The specific goals of the psychological assessment were twofold: a) predict success in academic training (training prediction); b) an estimate of how well the candidate will be able to function as an officer after graduation from the academy (career prediction). The results of the psychological assessment were presented to the selection committee; together with the results of the physical fitness tests and marks from the military service of the candidates, the selection committee will use the psychological report as the basis for the final evaluation. The chairman of the commission could reject the psychological report, but this was most often the case when the assessments of the candidate's military superiors conflicted with the psychological assessment. To check the reliability of the career prognosis based on the described AC procedure, further research was conducted on all military officers trained in 1953–1963. The criterion used was whether an individual officer, 25 years after completing officer training, was promoted beyond the rank of major. It was found that, on average, 32% of these officers were promoted to the rank of lieutenant colonel (Meincke, 1999).

In the years 1973–1974, a study was conducted in the U.S. Army Infantry School (USAIS) at Fort Benning. 408 officers and non-commissioned officers were tested in leadership courses. Field leadership performance ratings were obtained from supervisors, colleagues, and subordinates assessed at 6- and 18-month intervals after completion of the assessment and assignment to a new unit. The candidates were participants of the following education levels: Infantry Officer Advanced Course (IOAC), Infantry Officer Basic Course (IOBC), Branch Immaterial Officer Candidate Course (BIOCC) and Advanced NCO Educational System (ANCOES). The following were appointed to the team of assessors: 6 majors, 7 captains, 2 lieutenants, 3 senior sergeants, 2 first class sergeants and 1 staff sergeant. The assessors were selected by the District Attorney based on the following criteria:

- each man had to represent a different combat specialty;
- every captain and senior had to have command experience;
- every major, captain and sergeant had to serve in combat;
- officers had to have a higher degree in one of the behavioural sciences.

Before starting their duties, the assessors received four months of training in the principles and techniques of assessment, interviewing and counselling. The training included multiple trials of assessment exercises. The aim of the study was to diagnose and assess the following competencies: adaptability, administrative skills, communication skills, decision-

-making, strength, mental skills, motivation, leadership effectiveness in the organization, social skills and supervisory skills.

The following sequence of exercises was adopted:

1. Entry Interview: A background interview to elicit information related to motivation, experience and the assessee's self-knowledge of his strengths and weaknesses (time: 65 minutes).
2. Appraisal Interview: An applied exercise in which each assessee interviewed 2 others to select one for a position within a battalion. This interview elicited behaviours related to communication skills, social interaction and organization of thought (time: 105 minutes).
3. Leaderless Group Discussion: This exercise was a combined individual and group task in which 6 IOAC assessees were assigned a mission to distribute year-end funds among the represented directorates while attempting to acquire a maximum amount for his own directorate. IOBC, BIOCC, and ANCOES assessees were assigned a mission to get a soldier from their unit selected as the Brigade Soldier of the Month and providing a rank order of merit list of the available candidates. This exercise elicited behaviours associated with forcefulness, persuasiveness, organizational ability and group interaction (time: 140 minutes).
4. In-Basket Exercise (Three versions: IOAC – assessee was placed in the role of a battalion commander; IOBC/BIOCC – assessee was placed in the role of a company commander; ANCOES – assessee was placed in the role of a 1st Sergeant). An in-basket containing many items typical of the appropriate position was presented to the assessee who had 3 hours to address each item in the in-basket. This exercise elicited behaviours relating to problem solving, decision making, work organization and leadership. It was followed by an interview to discuss reasons for action taken and the relationship perceived to exist among some of the actions (Exercise 180'; Interview 80').
5. War Came (IOAC assessees only): This was an assigned-role rotating leader exercise conducted in two 160-minute sessions. Teams of 6 players engaged in cost effectiveness analysis in a military force planning environment. This exercise elicited organizational and leadership behaviour (Exercise 320'; Orientation 90').
6. Radio Simulate (Three versions: IOAC assessees were placed in company commander role; IOBC/BIOCC assessees were placed in a platoon leader role during a civilian emergency situation to assure that lack of military experience did not preclude them from participation in the exercises; ANCOFS assessees were placed in the role of acting platoon leaders). It was a 5-hour exercise using radios as the only means of communication. It elicited organizational and leadership behaviours (Exercise 300'; Orientation 90').
7. Assigned Leader Group Exercise (Field Exercise): This was a 5-hour rotating leader designated exercise involving a team of 6 assessees. There were 6 lanes with a different obstacle provided for each lane. It elicited emergent leadership, planning and organizational behaviours (300').

8. Management Exercise ("Conglomerate"): This was a 2-hour exercise divided into 2 planning and 2 trading periods. The 18-man assessment group was organized into three 6-man groups who competed against each other. This exercise elicited behaviours relating to emergent leadership, aggressiveness and social interaction (120').
9. Writing Exercise: This was an exercise designed to measure accuracy of information provided, grammar, spelling and completeness. The IOAC – 4 assessees responded to a Staff Action Paper and other assessment groups to a discharge action (60 minutes) (Dyer & Hilligoss, 1979).

In addition to these exercises, a number of psychometric tests were used in the study. The primary criterion for selecting specific tests was relevance of the variables to be tested to the leadership dimensions of administrative skills, communication skills, supervisory skills, forcefulness, adaptability, decision making, and mental ability. Additional criteria used in the selection of tests were: non-offensiveness of test items, suitability of content and format for use with mature adults, adequacy of normative data and theoretical discussions, timeliness of publication or revision, and effectiveness in administering the test. As a consequence, the following tests were used: Leadership Opinion Questionnaire, Watson-Glaser Critical Thinking Appraisal, Nelson-Denny Reading Test, Henmon-Nelson Test of Mental Ability, Leadership Q-Sort Test, Social Insight Test – Chapin, Work Environment Preference Schedule – Gordon, Strong Vocational Interest Blank, Edwards Personal Preference Schedule, Person Description Blank. Additional questionnaires were also developed to help improve the research process and gather suggestions for improving the techniques and administration of the AC/DC.

American researchers verified the obtained results using the analysis of correlation coefficients. In summary, they found that the largest proportion of criteria predictors were obtained from self-report instruments (with the least involvement of the evaluator's time and the evaluator); on the other hand, the most intense formal assessment exercises actually perform worst at predicting the field leadership criterion. Intermediate between these extremes was the Interview which provided a large number of predictors with only a moderate involvement of the time of the evaluator and the evaluator.

The obtained results were confronted with selected methods of officer development currently used in the Polish and American armies. In general, it was noted that the AC/DC officers still use the set of tools developed in the 1970s. A summary of the evolution of the development of AC/DC methods is presented in Table 7.1.

The obtained results were confronted with selected methods of officer development currently used in the Polish and American armies. In general, it was noted that the AC/DC officers still use the set of tools developed in the 1970s. A summary of the evolution of the development of AC/DC methods is presented in Table 7.1.

Table 7.1. Overview of AC/DC tools used in the years 1926–1973

Year	Author	Method / tool	Competence	AC/DC Personnel
Since 1926	Johann Baptist Rieffert Max Simoneit	"Round Table" / "Group Discussion"	communication leadership submission groupthink	selection committee: ■ permanent members of the examination centre, ■ commander of the examination centre (chairman), ■ several psychologists, ■ 2 officers from the armed forces, ■ medical officer (psychiatrist)
		biography analysis mental analysis	mental and spiritual development	
		expression analysis	forms of expression	
		performance analysis	execution of commands	
		leader test	cooperation with the team	
		controversial discussion among the examinees	behaviour in a familiar community	
Since 1933	Max Simoneit	■ obstacle courses that could not be completed ■ diagnosis of facial expressions ■ graphology ■ playing leadership roles	willpower mode of action	no data
Since 1940	Wilfred Ruprecht Bion	A series of leaderless group situations	group dynamics	psychiatrists and psychologists
Since 1927	Henry Murray	■ task simulation ■ biographical material ■ clinical interviews ■ psychological tests	personality	psychiatrists and psychologists
Since1942		■ situational tests ■ samples of tasks ■ intelligence test ■ stress interviews ■ stress tests	resistance to stress solving the conflict troubleshooting identifying natural leaders	psychiatrists and psychologists
1953–1963	Danish army	intelligence tests	logical-abstract reasoning, verbal skills, numerical skills and spatial reasoning	mixed commission: officers and psychologists
		math test	undergraduate arithmetic and math skills	
		technical comprehension test /mechanical	understanding technical and mechanical matters	
		technical comprehension test /mechanical	understanding technical and mechanical matters	
		general knowledge test	cultural, political, historical and scientific knowledge	
		personality test	psychological profile of competence	

		group exercise without a leader	cooperation skills, social skills, sensitivity to other people, energy and initiative	
1973–1974	USAIS	entry interview	motivation, experience, the assessee's self--knowledge of his strengths and weaknesses	6 majors, 7 captains, 2 lieutenants, 3 master sergeants, 2 first class sergeants, and 1 staff sergeant
		appraisal interview	communication skills, social interaction and organization of thought	
		leaderless group discussion	forcefulness, persuasiveness, organizational ability and group interaction	
		in-basket exercise	problem solving, decision making, work organization and leadership	
		war game	organizational and leadership behaviour	
		radio simulate	organizational and leadership behaviours	
		assigned leader group exercise	emergent leadership, planning and organizational behaviours	
		management exercise ("conglomerate")	emergent leadership, aggressiveness and social interaction	
		writing exercise	accuracy of information provided, grammar, spelling and completeness	

Source: own study.

An example of a comprehensive AC/DC solution is the Leaders Reaction Course (LRS) launched at the University of Land Forces in Wrocław (AWL). The track was constructed on the basis of benchmarking solutions used in the armies of other countries (e.g., Great Britain, Germany or the United States). The main objectives of using this type of track are: to improve leadership skills by creating opportunities for learning during practical operation as a commander, to assess the participant by observing his character traits and behaviour, to provide feedback to the participant regarding his leadership skills and competences, to enable the participant to observe strengths and weaknesses of team members while performing tasks, enabling development as a leader (Zielichowski & Kaliciak, 2020). It is therefore a kind of developed Development Centre implemented for the needs of the army.

The second important direction of game changes in the development of soldiers' human capital is the use of electronic solutions in the training of professional competences. This applies in particular to the use of trainers, simulators and computer games that very realistically reproduce the conditions of the modern battlefield. Simulation consists in recreating the properties of given objects or phenomena using a specific model. With regard to IT tools, we distinguish computer simulation which, properly programmed, allows you to study the behaviour of real objects based on observation of the operation of a computer program that simulates this behaviour, an example can be both a computer game and a professional simulator, e.g., flight. The use of IT systems to recreate the reality that surrounds us is commonly used by the US Army, where research and development work related to battlefield simulation is carried out on an ongoing basis. Progress resulting from the growing needs and challenges generated by the modern battlefield requires training of both individual soldiers and entire vehicle crews. The interactive intervention of the above-mentioned entities is created thanks to properly coordinated simulation tool, the so-called "distributed simulation", which allows for connecting and exchanging relevant information using a computer network in a war game. According to Salamon, an important element of such a simulation is the need to use computer simulation models that describe the behaviour of individual objects on the virtual battlefield. A computer generator of the behaviour of objects involved in the battlefield simulation increases the realism of the exercises. It enables a realistic simulation of combat operations without the need to connect many expensive real military simulators, intended for training crews of military vehicles and individual soldiers. New types of simulators developed in the last few years make it possible to combine constructive and visual simulation (Salamon, 2001). Visualization and programming of processes that take place during military operations faithfully reproduce, for example, the Virtual Battle Space (VBS) program. It is a platform that allows you to transfer military exercises to the monitor screen. The VBS includes IT tools used at all stages of the exercise (i.e., data preparation, scenario development, exercise implementation and analysis of the exercise course and evaluation of the results obtained) supported by a battlefield simulator (trainer). The trainer can design any scenario describing the simulation on the battlefield. A very important and useful component of VBS is a library of ready-made objects (a man in various configurations, a group of people, vehicles of various categories, buildings, roads, vegetation and other objects) along with their properties. The use of this type of IT tools can satisfy a certain part of the diagnostic and training deficit under AC/DC. Most of the world's leading armies, based on current experience and future actions resulting from them, strive to develop simulation and training systems in the direction that should lead to: a) combining them into a single--level and multi-level simulation network (with the possibility of using constructive, virtual and real at the same time); b) "supervising" the simulation network, e.g., through the "communication and integration bus", the task of which is to create an environment that enables the exchange of data between heterogeneous components of the simulation system, ensuring the transfer of data between the systems connected to it and enabling

further development of the simulation system by modernizing or switching it on newer simulators or trainers for the training process (Stopniak & Chmieliński, 2015).

It should be noted that the online, computer-administered test of the required competencies for junior non-commissioned officers throughout the army, has been tested since 2002 by the U.S. Army as a part of the technological solutions used in AC/DC. The use of the above tool to diagnose the competence profile of soldiers in the following categories was analysed: a) Basic Soldiering (Common Tasks – e.g., weapons, navigation, first aid); b) NCO and Army History, Customs, and the Seven Army Values; c) Leadership; d) Training (Campbell et al., 2014). The preliminary results of the AC/DC organization research were as follows:

1) work analysis is a key requirement of the operational test; this is particularly important where areas such as leadership must be defined in terms of work efficiency;
2) in the case of an army-wide test, the plan must be a flexible document that has a certain durability and usefulness over the years; an annual full revision of the plan is neither practical nor desirable; one way to achieve the desired level of flexibility is to define broader performance categories; much more work is also needed on the definition and description of categories, especially in doctrinally weak areas such as history/customs, values, leadership and training;
3) tracking the movements of the evaluated person creates many problems; it is primarily useful in settings where (a) a test is used as a criterion and (b) tracking can be by individual; if assessees are allowed to choose which path to take (especially in operational evaluation), this has implications for the equivalence and comparability of tests and whether there are benefits to taking one path or the other; the matter is complicated by the fact that not all soldiers will have a similar level of experience with the weapons and equipment they use and which may be affected by the decision situation;
4) because the guidelines from the army command were that the promotion test should include elements of the situational assessment test, the following performance dimensions were analysed in the leadership study: problem-solving and decision-making skills, motivating, leading and supporting subordinates, directing, monitoring and supervising work, training others, relating to peers and supporting them, team leadership, concern for the soldier's quality of life, cultural tolerance;
5) failed to configure the point scale for tasks/questions with the ranking technique;
6) the requirement of prior notification and preparation of the soldier for AC/DC is an important part of the assessment program;
7) the pilot test was configured to be administered via the Army's Digital Training Facilities (DTF) to serve as a portal to the military distance learning programme; despite limitations in availability, DTFs are still the most promising place for an operational assessment test;
8) more technical problems than expected were encountered during the pilot tests; problems are divided into three broad categories: login problems, computer-specific problems, and system problems; soldiers must have confidence in the testing system,

career-critical tests are sufficiently stressful without distracting technical issues; before the solution is used for real AC/DC, technical problems must be solved and interference removed;

9) the army must establish a process of selection, training and certification of persons supervising tests implemented as part of IT solutions;
10) the ethical aspect is important, namely the need to implement a culture of intolerance towards fraud.

The third key game changer implemented in AC/DC is the discovery of neurology. As a part of the experiments, neurodiversity is tested by assuming that people experience and interact with the world around them in many different ways, and one of the reasons for this is, e.g., neurological deficits and/or neurotransmitter levels (Johannessen, 2020). The study of neurodiversity is currently treated only at the level of a complementary tool under AC/DC; correlations with the results of other tools, e.g., psychological tests, are analysed.

7.5. Conclusions – Key Results, Findings, Limitations and Future Research

Development centres used in armies focus primarily: subjectively – on the officer cadre, objectively – on leadership. A direction of assessment was developed, in which the efficiency and effectiveness of the commander in operational activities was taken as the main criterion. At the same time, it is important that these measures do not concern the individual results of a given officer, but the collective results. This means that the measure of the performance of a given leader (officer) is the ability to carry out the tasks of the team he leads.

It was noticed that since the 70s of the 20th century, the foundation of AC/DC has been unchanged, namely the multidimensionality of the study, the complexity of the tools used and the collectivism of the assessment. Due to the development of technological solutions, psychology, sociology, neurology, etc., the tools and forms of conducting individual elements of the assessment are modified.

Researchers point out that when designing AC/DC in the military environment, special attention should be paid to the selection of assessors, the construction of a competency profile based on the analysis of operational activities performed by the assessed person, the selection of competencies that can be observed and thus assessed. Moreover, the results of the assessment should be understandable for army commanders to translate the observations and conclusions of psychologists into the language of military development practice. As indicated in the final part of the article, participation in AC/DC is a very stressful situation for a soldier, as it affects his further career, therefore, every effort should be made to ensure maximum comfort for participants, providing comprehensive information about the purpose of the entire process, its next steps and about the results; this process must not be interrupted by, for example, technical problems.

The use of AC/DC in a military environment, as well as in a business environment, is time-consuming and cost-intensive. However, on the other hand, it is the best method of observing and assessing people in action, which, due to the specificity of the soldier's profession (officer, commander), is a key argument for its use. The standardization of the methods and techniques used also speaks in favour of AC/DC. The data obtained as part of the study can be used as a valuable source of predictors for predicting and forecasting the behaviour of soldiers in stressful situations, during operations under pressure, in a dynamic, uncertain environment. In addition, the results of AC/DC should be the basis for planning the training process of officers, profiling the officer's profile and designing trajectories of officers' career paths. It is suggested to divide the officers into two groups: in the command and staff divisions. Careers of officers after being qualified to a specific group should run in a strictly defined group of positions (command or staff positions). It should be remembered that serving in staff positions implies the need to have different competences than in command positions, which does not determine the validity of any of the indicated positions.

In the opinion of the researchers, it is justified to create an AC/DC model that would support the recruitment of candidates for officers and the development of officers in active service. The data obtained from the conducted research and observations in conjunction with the profile of the candidate for an officer would help to select candidates with optimal predispositions. It is also important that the AC/DC toolkit incorporates the latest scientific developments, such as virtualization and neurotransmitter research. Table 7.2 presents the author's proposal of the AC/DC toolkit that can be used in the examination of officers in the field of leadership competences.

Table 7.2. An exemplary set of AC/DC tools that can be used in the examination of officers in the field of leadership competencies

Method/tool	Competence	AC/DC Personnel
Psychological tests	psychological profile of competence, personality	Selection committee: ■ commander of the examination centre – chairman – senior officer with experience, ■ two psychologists, ■ three officers from the armed forces representing various specialties with experience in a line unit
Interview	communication skills, information related to motivation, experience self-awareness	
Situational tests: ■ competitive exercises ■ exercise under pressure	resistance to stress troubleshooting willpower aggressiveness social interactions	
Obstacle course	methods of operation and efficiency	
Leader test	cooperation with the team persuasion inner strength leadership behaviour	

Group exercise without a leader	identifying natural leaders cooperation skills social skills sensitivity to other people empathy energy and initiative	
Virtual Battlefield Systems (VBS)	decision making process the ability to make independent decisions knowledge of command theory/procedures goal-oriented attitude towards people (soldiers) tendency to make unethical/unlawful decisions inclination to unethical and illegal behaviour resistance to the impact of external stimuli in the decision-making process (noise, confusion, chaos, barriers and information noise)	
Testing the level of selected neurotransmitters (dopamine, acetylcholine, serotonin, GABA)	tendency to certain behaviours (hyperactivity, analytical mindset, tendency to take risks, etc.)	

Source: own study.

Undoubtedly, the conclusions from the research that was conducted among soldiers became the foundation of AC/DC used in business. It should be concluded that the solutions currently used in the army, especially those related to the implementation of new technologies and scientific achievements, are universal and can be used in other sectors of the economy. In addition, it can be seen that the army also draws from solutions provided by business and the world of science.

It is also worth mentioning that the results of research, especially in the literature, may not be complete due to often confidential nature of research conducted in the military sector. This constitutes a fundamental limitation in the current transfer of knowledge between the military and economic sectors. The confidentiality clause covers primarily the results of tests conducted on soldiers, as they would provide information about the soldiers' strengths and weaknesses in the mental sphere. This poses a significant threat, especially in the context of hybrid warfare.

However, the main directions of research in the field of AC/DC can be indicated. These are undoubtedly: problems of using artificial intelligence in the assessment process, determining the limits of neurobiological interference in human capabilities, and ethical issues related to the above-average development of human capabilities in the context of their military use.

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Ewolucja ośrodków rozwoju w sektorze wojskowym – od początków do *game changers*

Streszczenie: W artykule zaprezentowano wyniki przeglądu literatury i materiałów źródłowych (wojskowych i cywilnych), którego celem było określenie: diagnozowanych kompetencji, stosowanych metod diagnozy oraz ich skuteczności przy zastosowaniu Assessment/Development Centres. Badaniem objęto materiały z lat 1920––1974, w tym odtajnione dokumenty z eksperymentów przeprowadzanych w armiach niemieckiej, brytyjskiej, duńskiej i amerykańskiej. Otrzymane rezultaty skonfrontowano z wybranymi metodami rozwoju oficerów stosowanymi współcześnie w armii polskiej. Stwierdzono, że centra wykorzystuje się głównie w pracy z oficerami, a przedmiotem diagnozy są przede wszystkim kompetencje przywódcze (definiowane wymiarem wydajności). Od lat 70. XX w. nie zmieniły się podstawowe zasady organizacji centrów, mianowicie wielowymiarowość badania, złożoność zastosowanych narzędzi i kolektywizm oceny. *Game changers* w tej dziedzinie stanowią natomiast narzędzia i formy przeprowadzania poszczególnych elementów oceny; wdrażane są rozwiązania związane z informatyzacją, wirtualizacją i neuroróżnorodnością, których przykłady opisano w niniejszym opracowaniu.

Słowa kluczowe: centra oceny, centra rozwoju, szkolenie wojskowe