

DOCTORAL THESIS

THE DEVELOPMENT AND IMPLEMENTATION OF ASSESSMENT CENTRES AS A METHOD FOR PERSONNEL SELECTION

- ABSTRACT -

Claudia (BEJUȘCA) INDREICA

**Doctoral Advisor:
Univ. Prof. PhD Nicolae JURCĂU**

INTRODUCTION

In any employment screening process, in order to envision the behaviour of the applicant in the position he or she was hired, we have to make use of certain employee selection instruments with predictive validity regarding the applicant's conduct. When it comes to manager positions, regardless of the field of work, some of the most reliable instruments in terms of face validity are the assessment centres. Studies show that the use of such centres has increased steadily in recruitment activities, precisely due to their results (Gaugler, Pohley, 1997; Gaugler & Co., 1987; Lievens, 2003).

According to the *Guidelines and Ethical Considerations for Assessment Center Operations* (2009), an assessment centre consists of a standardised evaluation of behaviour based on multiple inputs. There are used several trained observers and various techniques. The process entails carrying out behaviour appraisals, mainly from specifically developed assessment simulations. These observations are pooled in a meeting among the assessors or by means of a statistical integration process. In a dialogue on integration, comprehensive accounts of behaviour and frequently ratings of it are pooled together. The analysis results in evaluations of the performance of the assesseees on the dimensions or other variables that the assessment centre was designed to measure. The statistical integration method should be validated in compliance with professionally accepted standards.

A well designed assessment centre presents several gains over the traditional assessment methods. One of the main advantages is the accuracy of rating performances in that specific job. Another one relates to the applicants' ability to self-assess. Thus we build a good basis for the identification of the individual development needs. In order to obtain and use such advantages, we must pay great attention to the process of designing assessment centres and also be mindful of all the factors that contribute to the quality and consistency of the evaluation (Lievens, 2001a, 2001b, 2002; Lievens, Conway, 2001).

As stated before, assessment centres have many gains, such as: high level of reliability; good face validity from applicants; is able to measure several abilities, which then may be used in the validation of various criteria, namely performance, successful training programs, career development, identification of potential in certain positions (Gaugler & Co., 1987).

Thornton and Rupp (2006) underline the similarities and differences between the assessment centre method and other assessment procedures (Table 1).

Consequently, we may identify the characteristics of assessment centres, namely the manner in which the various individual assessment procedures are combined and employed. The many evaluation procedures may incorporate various techniques (tests, simulations exercises and interviews), more than one simulation exercise including important requirements of the target job, considerations on complex behaviours, which are relevant for managerial competencies. We use multiple assessors (including higher level managers) and last but not least a systematic process of pooling and integrating the information provided by the observers. According to Thornton & Rupp (2006), the result of an assessment centre is an appraisal of several managerial competencies and in many cases, an overall evaluation of an applicant's potential to succeed in the targeted jobs.

An essential step in designing such an assessment centre is to clearly determine its purpose. Table 2 presents the characteristics of assessment centres, taking into account their various purposes.

As shown below, the dimensions evaluated differ from one program to the other. If the purpose is promotion, then the assessment process should involve competencies mirroring long term development potential. If however, the goal is diagnosis and training, then the program should evaluate such dimensions that may be further developed in the program or in the future.

Table 1. Comparing characteristics of alternative assessment methods and Assessment Centres (Thornton & Rupp, 2006)

Alternative Assessment Methods	Assessment Centre Method
<p><i>Individual assessment:</i></p> <ul style="list-style-type: none"> • Holistic evaluations made; • Assessment conducted by a single person; • One individual assessed at a time; 	<ul style="list-style-type: none"> • Specific evaluations made, which may be combined into an overall rating; • Assessments conducted by multiple assessors; • Multiple individuals may be assessed at a time (e.g. 6-12);
<p><i>Multisource feedback :</i></p> <ul style="list-style-type: none"> • Assessors receive limited to no training; • Feedback is mostly in writing; • Multiple assessors used (supervisors, co-workers, subordinates, customers); 	<ul style="list-style-type: none"> • Assessors receive extensive training; • Feedback is often oral and written; • Multiple assessors, mostly from upper management, HR or outside the organisation;
<p><i>Behavioural background interview:</i></p> <ul style="list-style-type: none"> • Self accounts of past behaviours; • Can include fake data; 	<ul style="list-style-type: none"> • Observations of current behaviour;
<p><i>Cognitive ability tests:</i></p> <ul style="list-style-type: none"> • Abstract problems; • Abilities assessed based on responses to items; • May cause adverse impact; 	<ul style="list-style-type: none"> • Concrete, work-related problems; • Require a demonstration of the behaviour needed to solve problems; • Little adverse impact caused;
<p><i>Personality questionnaire:</i></p> <ul style="list-style-type: none"> • Easy to fake; • Self description; • Measures stable traits; • Low face validity. 	<ul style="list-style-type: none"> • Hard to fake; • Description by observers; • Can measure both stable traits and developable skills; • Participants respond favourably, high face validity.

Table 2. Comparing Assessment Centres with different purposes
(Thornton & Rupp, 2006)

	Purpose of Assessment Centre		
	Promotion/ Selection	Diagnosis of training needs	Skill development
Applicants	High potential employees or applicants.	All interested employees.	All interested employees.
Target job	Target position to be filled now or in the future.	Current or future job.	Current or future job.
Number of dimensions	Few (5-7), overall level.	More (8-10), specific.	Few (5-7).
Nature of dimensions	Potential and traits.	Developable, conceptually distinctive.	Skills easy to train.
Exercises used	Generic.	Moderate similarity to target job.	Work models.
Assessment time	Rather short (½ – 1 day).	Rather long (1½ – 2 days).	Rather long (1½ – 2 days).
Observation method	Intensive monitoring.	–	–
Integration method	Objective, quantifiable.	Individualised for every applicant.	–
Report type	Short, descriptive.	Long, diagnosis.	Immediate, oral.
Feedback respondents	Applicants, managers – 2 higher levels.	Applicants and supervisors.	Applicants and maybe supervisors.
Feedback providers	HR personnel.	HR experts or assessors.	HR experts, trainer or facilitator.
Outcome	Overall rating (OAR).	Assessment by dimension.	Behavioural proposals.

In Romania, Assessment Centres have been scarcely used so far, mainly because by comparison to other selection screening methods, the design and validation of such centres involves rather high costs. Another reason however is linked to HR specialists here, who have not thoroughly studied this method, in a context where current needs do not allow more complex approaches, but whose benefits may be seen in time. This situation is further enhanced on the one hand by the lack of vision and strategy in human resources policies, as well as the centralised

approach in the decision-making process on the other hand, leaving it all to the exclusive competence of the general manager.

CHOICE OF SUBJECT MATTER

This study is based on a need which became more and more apparent during the major changes that occurred in organisations, in terms of managerial screening and selection instruments. The early 2000 in Romania saw the excessive application of psychological tests, despite the fact that the personality traits or constructs tracked were irrelevant in the applicant's performance in the targeted manager position. The company's decision-makers, looking for applicants to fill their vacant manager positions, were content with the information received about their applicants, even though such information often did little to ensure the selected applicant would actually have great performances in that job. Nonetheless, in terms of employee selection, this stage was an upgrade from the former 90s methods, when hiring was based upon "recommendations". There were no data on the applicant's competences, as he was selected based on how close the applicant was to the trusted individual, making the recommendation.

On the other hand, this stage allowed the applicants in manager positions to get accustomed to various psychological tests, such as personality questionnaires, as well as to cognitive ability tests. In the beginning, psychological tests were regarded as extremely fascinating, despite the high requirements of time, both on the part of the applicant and psychologist. The vision too underwent improvements, from the phase where an applicant would give the tests and then the corresponding results would be showed only to the employer, to a stage where the specialist would be "obliged" to provide the applicant with a detailed feedback on the psychological tests passed. The current approach is to give the applicant a general feedback after passing all the screening steps, including the final interview with the employer.

In time, the applicants acquainted themselves with the psychological tests used in these processes, which prompted them to devise various strategies in order to pass them with the best possible results. Another aspect that influenced the use of such tests was the time requirements. The completion of a psychological test meant between 2 and 4 hours, which was a lot for an applicant and even more for the HR specialist, whether he was an employee of the organisation ordering the tests or of a recruitment agency. If we added to this the time spent with the first screening interview and then the final interview with the decision-maker, the time spent by an applicant during the selection process easily reached 5 to 6 hours, depending on the screening steps, whereas for the company, a full

selection process with all applicants was be close to 4-6 weeks. Such duration was far too long, considering also that the notice period for an upcoming vacancy was between 15 and 30 days. Consequently there was no time to properly carry out the selection process and hire a new employee, if we also counted their notice period. The organisation would thus find itself in the situation where there was about a 30-day interval between the departure of the employee, formerly filling the target position and the arrival of the new one, when no one would actually occupy said job. Such scenario, with vacant managerial positions, was dreadful for an organisation.

Another variable with a bearing on this period was the face validity of the trials in the selection process. For the managers, a series of trials or tests were deemed irrelevant for filling the target position. Many a times, the organisation was confronted with statements such as: *“if you plan on giving me this test don’t because I’ve already taken it before and I find it irrelevant, I won’t takes it again”* or *“I hope this is not the test with one hundred questions, I’ve already taken it a few times before”*. This sort of reactions were indicative of the applicants’ level of involvement in the screening process, moreover since they were not convinced that such tests were actually relevant in predicting their success and performances in the target jobs.

During 2005-2007, Romania went through a period of economic growth, but experienced further difficulties in screening and selection processes, namely a lack of applicants for vacant positions. On the labour market, the offer for vacancies far exceeded the demand, which lead to a change in attitude for the applicants. Salary expectations grew unjustifiably, without also counting the added value brought to the company, and the manner in which they would contribute to its turnover. Furthermore, applicants would easily withdraw from selection processes, even after passing several stages, on account of the process being irrelevant or not engaging enough. It all escalated to applicants deeming the target jobs unattractive or the organisation unappealing if such processes were even required for hiring.

On the other hand, companies demanded a thorough screening process, which were to provide them with all the needed information, and even ensure them that once hired, the applicant would rate very high on the job performance scale. The greatest risk was with managerial positions, where an inadequate employee would adversely influence the course of the business and even have a negative bearing on the organisation’s financial pointers.

Consequently, human resources specialists were faced with a new challenge: to design a selection process and devise screening instruments that were able to provide as many information as possible, in order to predict the applicant’s job

performance once hired, and also that were enticing and relevant enough for the applicants, in such a manner as, regardless of the final results, they would all consider the process a positive and useful experience.

On such grounds, the development and application of Assessment Centres as an employee screening instrument became the optimal solution to the problem. This method meets the requirements of all the parties concerned – applicant and employer on one hand and HR specialist on the other. The latter is content with the amount and quality of the information obtained on the applicant, whereas the employer – the organisation – is satisfied with the value of the selection results and the report sent by the specialist.

Assessment Centres are not particularly used in our country, mainly due to the time and cost requirements involved in their implementation, as well as due to a lack of training within the companies, given the current needs in this field. On this account, specialised organisations, recruitment and selection agencies and so on should take advantage of this opportunity and allocate their funds and resources correspondingly. This is a long term investment as companies will always resort to the expertise of such human resources organisations for managerial screening and selection. Naturally, an important aspect of this issue is maintaining an attractive price. The marketability of these services will, in time, ensure their development and perfecting.

THE PURPOSE OF THIS THESIS is to design and validate an Assessment Centre in order to use it as a predictor in managerial selections. We would thus create a working instrument based on the dimensions and competencies required to achieve managerial success. Our case study is focused on selecting the director in charge of operations for an industrial production company.

Goals:

1. Identify the competencies / dimensions required to ensure a successful performance in the position of operations director within a manufacturing facility.
2. Design an Assessment Centre, able to measure the competencies previously identified.
3. Validate the Assessment Centre as an accurate predictor for ensuring the success of an operations director in a manufacturing facility.
4. Validate the Managerial Skill Appraisal Form (Pitariu, Pitariu & Albu, 1999), as an instrument in management performance assessment.

CASE STUDY: DESIGN

Stages

We conducted our case study in two separate stages. We first built the Assessment Centre and then we proceeded to its validation, in the second phase.

A. Assessment Centre set up.

The set up is based on a preliminary survey, where a group consisting of 14 managers was asked to define those competencies or dimensions that ensure managerial performance in the position of director in charge of operations. The survey pointed out to **5 key dimensions** of managerial competence:

- D1* – planning and organising;
- D2* – company and business awareness;
- D3* – communication;
- D4* – decision-making;
- D5* – teamwork.

To point out these five dimensions, we used the following **types of exercises**:

- E1* – leaderless group discussion, without assigned roles;
- E2* – in-basket;
- E3* – leaderless group discussions, with designated roles;
- E4* – role-play;
- E5* – factory simulation.

Some exercises were devised and others, which already existed, were merely applied. Nonetheless, we should mention here that not all dimensions could be measured during an exercise (Table 3).

Table 3. Dimensions measured during every exercise

Dimension	Exercise				
	<i>E1</i>	<i>E2</i>	<i>E3</i>	<i>E4</i>	<i>E5</i>
<i>D1</i>	X	X	X	X	X
<i>D2</i>	X	X	X		X
<i>D3</i>	X	X	X	X	X
<i>D4</i>		X	X	X	X
<i>D5</i>	X	X		X	X

Key:

D1 – planning and organising; *D2* – company and business awareness; *D3* – communication; *D4* – decision-making; *D5* – teamwork.

E1 – leaderless group discussions, without designated roles; *E2* –in-basket exercise; *E3* – leaderless group discussions, with designated roles; *E4* – role-play; *E5* – simulation.

The applicants' behaviours were evaluated by four assessors: 2 managers and 2 psychologists. The 4 assessors underwent a process of training, which constitutes a very important aspect in the development of an Assessment Centre, namely: defining the dimensions, categorising the behaviours and describing the exercises used for assessment.

B. Assessment Centre validation.

The validation activity was carried out by applying the centre to a sample of subjects from 4 different organisations (A-D), all manufacturing companies. In every such facility, the purpose of the centre was to use it as an instrument in the internal selection process, for the position of operations director. The survey was conducted with 33 individuals (22 men and 11 women), all employed in the four companies (Table 4). The age of the participants ranged between 27 and 58 years old, meaning an average of 41.1 years old ($\sigma=10.9$).

Table 4. Sample structure by gender

Sex	Company				Total
	A	B	C	D	
Men	4	5	6	7	22
Women	6	2	3	0	11
Total amt	10	7	9	7	33

CASE STUDY: RESULTS

The Validation Procedure of the Assessment Centre

The evaluation using the Assessment Centre as an instrument for appraisal was conducted by 4 trained assessors, in 2007.

On the other hand, all the subjects were assessed by means of a *Managerial Skill Appraisal Form*, initially designed by Pitariu, Pitariu & Albu (1999). This form enables us to measure 18 dimensions (I_1 - I_{18}) which are instrumental in managerial performance and success: I_1 – *Technical competence*, I_2 – *Learning ability*, I_3 – *Creativity at work*, I_4 – *Persuasion*, I_5 – *Group integration*, I_6 – *Communication*, I_7 – *Supervision*, I_8 – *Decision-making ability*, I_9 – *Organisational skills*, I_{10} – *Energy input*, I_{11} – *Loss of autonomy*, I_{12} – *People skills*, I_{13} – *Conformity to norms*, I_{14} – *Self-improvement*, I_{15} – *Image preservation*, I_{16} – *Loyalty*, I_{17} – *Productiveness*, I_{18} – *Initiative*.

Every dimension constitutes an item, which further consists of a definition and a rating scale, with seven steps and three behavioural anchors (fixed at step levels 1, 4 and 7). An additional item, I_{19} , requires the assessor to synthesise the assessee's managerial skills, by using a 7-step scale.

In the study we focused on the rank correlation between assessors, in 2007, using Kendall's coefficient τ_b and the arithmetic mean of all item scores per company during the same year. We chose to employ Kendall's rank correlation coefficient because:

- The number of individuals assessed in every company was too low to calculate the linear correlation coefficient;
- In many cases, the number of the score values, given by a rater was different from the number of the score values given by the second assessor; for this reason, we couldn't determine Cohen's kappa coefficient of inter-rater agreement;
- The number of possible score values (7) was lower than the number of the assessees in every organisation; hence from all of Kendall's coefficients (3), only τ_b could give extreme values.

The inter-rater agreement is good if τ_B has a positive value and is as closer to 1 as possible. It becomes significant when it reaches a threshold of $p=0.05$.

For companies A and C, the majority of the τ_B coefficients have a positive value. The negative ones have low values and are not significant at said threshold of $p=0.05$. The fact that there are few coefficients who become significant at $p=0.05$ may be explained in the following manner: generally, the scores received by an individual from two raters are not equal (there are very few items where more than half of the subjects could have received the same score from both assessors) (Table 37). Also, there weren't cases where one of the raters gave the majority of the subjects higher scores than the other assessor (sustained by the fact that the mean of the scores' differences, at absolute value, is lower than 1 at almost all items) (Table 38). In other words, the assessors didn't rate in the same manner, but one of them rated some individuals higher and some lower than the

other assessor. In most cases, the difference between the scores (when said scores weren't identical) was 1 point.

For company B, inter-rater agreement has a lower level than in the case above, for companies A and C. There are more τ_B coefficients with negative values and two of them are even statistically relevant at $p=0.05$. For two items – 15 and 19 – one of the assessors gave all the subjects the same score: 5. Inter-rater agreement is lower between the first and the second assessors than between the second and the third, respectively the first and the third. There are more negative τ_B coefficients between the first and second raters and fewer items where at least half of the subjects were rated the same by the two assessors.

For this company also the absolute values of the arithmetic means of the differences between the scores given by two raters are lower than 1 for most items (Table 38). The highest mean is 1.286, which is actually not high at all.

For company D, most of the τ_B coefficients determined between the first and the third rater, respectively the second and the third rater have a negative value. For 7 of the 19 items identified in the Appraisal Form, τ_B coefficients determined between the first and the third assessor are negative and relevant at $p=0.05$. At most items, the first and third assessors rated the same for no more than 2 individuals. For 15 of the 19 items identified in the Form, the mean of the score differences between the rates of the first and the third assessor, at absolute value, exceeds 1 point.

Thus, the findings show us that the third rater appraised differently from the other two (either he had different definitions for the constructs or he was not acquainted with the subjects assessed).

We might conclude that in companies A and C there is a better agreement between the scores set by the raters for the items included in the Appraisal Form (in these companies, there is a higher number of items for which at least half of the subjects were rated equally by the two assessors. There is also a higher number of items for which the arithmetic mean of the differences between the scores, taken at absolute value, is lower than 1), whereas the score correlation was determined at a lower level in company D, where the third rater had a different appraisal approach than the other two.

In determining the rate average, we considered, for every individual, the mean of the scores given for the Form's items in 2007.

For companies A, B and C, we determined the means by considering the scores given by the three raters.

For company D, because the scores given by the third assessor were different from the others', we determined the mean by considering only the rates of the first two assessors.

Figure 1 below shows the score means for every item, per company.

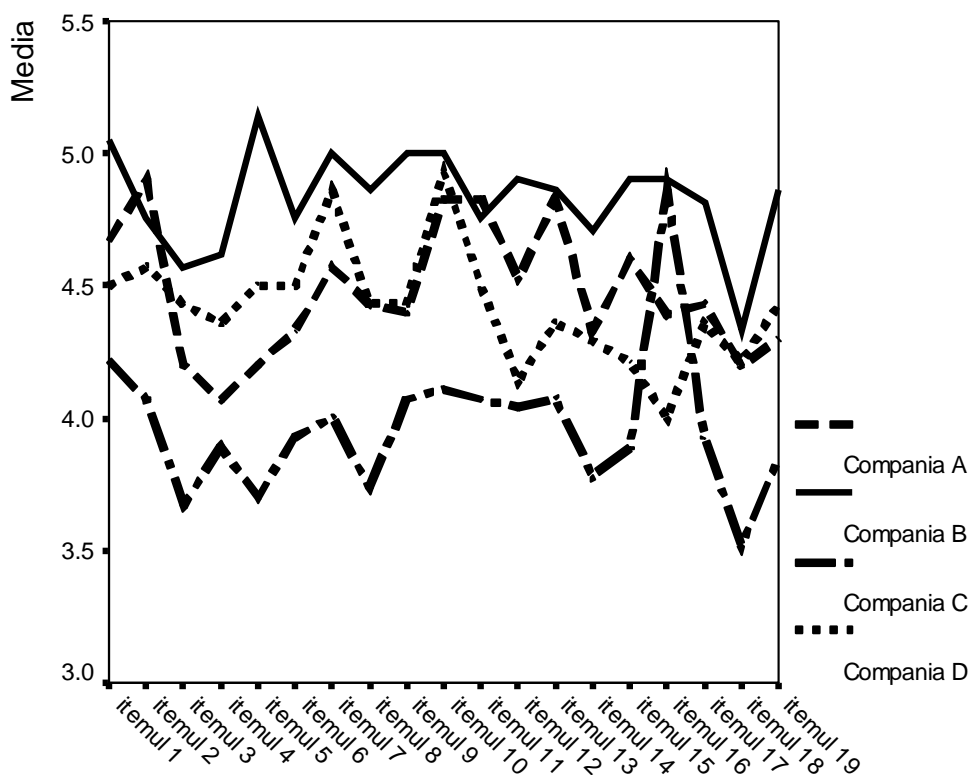


Fig. 1. Score means for the items identified in the Appraisal Form, by company

With the same purpose in mind – to study the predictors – we examined the inter-rater agreement during 2008 and 2009.

We made the same arrangements as for the previous year, the only difference being that for 2008 and 2009 the subjects were assessed by only two raters and not three.

The findings showed that for 2008 and 2009, inter-rater agreement was good.

Table 5. Number of items for which at least half of the subjects were appraised in the same way by the two raters, in 2008

Company	No. of items
A	8
B	11
C	11
D	7

Table 6. Number of items for which the arithmetic mean (at absolute value) of the differences between the scores given by the two raters is lower than 1, in 2008

Company	No. of items
A	19
B	18
C	19
D	19

Table 7. Number of items for which at least half of the subjects were appraised in the same way by the two raters, in 2009

Company	No. of items
A	16
B	12
C	11
D	12

Table 8. Number of items for which the arithmetic mean (at absolute value) of the differences between the scores given by the two raters is lower than 1, in 2009

Company	No. of items
A	19
B	19
C	19
D	18

The data gathered and analysed show us that the Managerial Skills Appraisal Form may be used as a criterion in the selection process.

Please note that in this study, we used only 5 items, corresponding to the 5 dimensions of the Assessment Centre (Table 9).

Table 9. The Items of the *Managerial Skills Appraisal Form*, used in the validation study for the Assessment Centre and the Dimensions measured by said Centre

Item in the <i>Appraisal Form</i>	Dimension of the Assessment Centre
<i>I</i> ₅ – Group integration	<i>D</i> ₅ – Teamwork
<i>I</i> ₆ – Communication	<i>D</i> ₃ – Communication
<i>I</i> ₈ – Decision-making ability	<i>D</i> ₄ – Decision-making process
<i>I</i> ₉ – Organisational skills	<i>D</i> ₁ – Planning and organising
<i>I</i> ₁₇ – Productiveness	<i>D</i> ₂ – Company and business awareness

The assessment using the Appraisal Form was conducted by the immediate superior, together with the functional supervisor, in the years of reference – 2007, 2008 and 2009. In 2007, the assessment was made in collaboration with the operations director of the time, who was scheduled to later leave the company.

The next step in the study consists of an analysis of the predictor.

The Assessment Centre as predictor was designed in compliance with the rules and regulations provided by the *Guidelines and Ethical Considerations for Assessment Center Operations* (2009), in order to achieve the **content validity**: collecting from the field-oriented experts all the information regarding the tasks and duties of an operations director in a manufacturing facility, as well as the survey conducted with the help of 14 managers, with the view to obtain the 5 dimensions / competencies required for the successful performance of this job.

The face validity was obtained by analysing the responses of the Assessment Centre’s subjects, from all the participating organisations, immediately after the completion of the exercises. We collected the data from the individuals’ replies to questions such as: *To what extent do these exercises imitate real life situations that an operations director might come across during the performance of his tasks? What is your reaction at the end of this experience?* The results obtained reflected a positive outcome, as the subjects considered that

such Assessment Centre is relevant and represents a fair and accurate method of appraising the competencies required in the new position.

We further checked **the convergent validity**, going along the following line: if the dimensions were well defined and the exercises well chosen, then for every dimension, the corresponding ratings should correlate directly, significantly at least at $p=0.05$.

Work method: We determined the linear correlation coefficients for the results of the assessment exercises, for every separate dimension (Table 10). All the calculations were made considering the OAR values per dimensions and exercises, for the entire sample of 33 individuals.

Table 10. Linear correlation coefficients for the exercise results, for every dimension ($N=33$)

Exercises for which r was determined		Dimensions				
		<i>D1</i>	<i>D2</i>	<i>D3</i>	<i>D4</i>	<i>D5</i>
<i>E1</i>	<i>E2</i>	0.577***	0.569***	0.518**	-	0.687***
	<i>E3</i>	0.483**	0.360*	0.476**	-	-
	<i>E4</i>	0.349*	-	0.398*	-	0.748***
	<i>E5</i>	0.456**	0.285	0.397*	-	0.486**
<i>E2</i>	<i>E3</i>	0.682***	0.601***	0.447**	0.583***	-
	<i>E4</i>	0.465**	-	0.459**	0.403*	0.714***
	<i>E5</i>	0.601***	0.511**	0.390*	0.557***	0.370*
<i>E3</i>	<i>E4</i>	0.546***	-	0.539***	0.646***	-
	<i>E5</i>	0.635***	0.510***	0.363*	0.541***	-
<i>E4</i>	<i>E5</i>	0.631***	-	0.587***	0.554***	0.707***

Key: *** $p<0.001$; ** $p<0.01$; * $p<0.05$.

Therefore, the convergent validity is very good. From all the linear correlation coefficients determined for the results of the assessment exercises, only one is insignificant at the value of $p=0.05$ (for dimension *D2* – company and business awareness, between exercises *E1*– leaderless group discussions, with assigned roles and *E5*– simulation), and half of them (19 out of 38) are significant at $p=0.001$. Thus we conclude that the dimensions have been correctly defined.

The discriminant validity was based on the following idea: if the dimensions were well defined and the exercises well chosen, then for every exercise, the results of the dimensions' ratings do not correlate.

Work method: We determined the linear correlation coefficients for the assessment results of the dimensions, for every separate exercise in the Assessment Centre (Table 11). All the calculations were made considering the OAR values per dimensions and exercises, for the entire sample of 33 individuals.

Table 11. Linear correlation coefficients for the dimensions' results, for every exercise ($N=33$)

Dimensions for which r was determined		Exercises				
		<i>E1</i>	<i>E2</i>	<i>E3</i>	<i>E4</i>	<i>E5</i>
<i>D1</i>	<i>D2</i>	0.353*	0.562***	0.564***	-	0.490**
	<i>D3</i>	0.413*	0.598***	0.287	0.447**	0.247
	<i>D4</i>	-	0.373*	0.615***	0.632***	0.653***
	<i>D5</i>	0.269	0.390*	-	0.588***	0.501**
<i>D2</i>	<i>D3</i>	0.218	0.675***	0.632***	-	0.427*
	<i>D4</i>	-	0.377*	0.766***	-	0.633***
	<i>D5</i>	0.040	0.300*	-	-	0.600***
<i>D3</i>	<i>D4</i>	-	0.433*	0.520**	0.634**	0.505**
	<i>D5</i>	0.580***	0.504**	-	0.348*	0.385*
<i>D4</i>	<i>D5</i>	-	0.373*	-	0.454**	0.536***

Key: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

Therefore, the discriminant validity is rather low. From a total of 38 correlation coefficients, only 6 are insignificant at $p=0.05$, whereas 14 coefficients (which is more than a third) are significant at $p=0.001$. The correlations tend to be lower for exercise *E1* – leaderless group discussions, with assigned roles and higher for exercise *E4* – role-play (where all the correlation coefficients are significant at least at $p=0.05$). As a fact, lower discriminant validity occurs often in Assessment Centres studies.

For a further confirmation of the **construct-related validity** of the Assessment Centre, we processed the results obtained from the dimensions' assessment during the exercises (OAR) by factor analysis (the Principal Component Method and the Varimax Rotation Method).

We drew 6 factors, which cover 79.200% of the total variation (*F1*:16.636%; *F2*:15.208%; *F3*:12.904%; *F4*:11.623%; *F5*:11.550%; *F6*: 11.279%).

Table 12 below contains the assessment saturations in the factors we previously drew out.

Table 12. Linear correlation coefficients between the ratings of the dimensions, as obtained from exercises and the factors drawn by factor analysis, significant at value $p=0.05$

Dimension	Exercise	Factor					
		<i>F1</i>	<i>F2</i>	<i>F3</i>	<i>F4</i>	<i>F5</i>	<i>F6</i>
1	1				0.848 **		
	2	0.384			0.696 **		
	3	0.579 **			0.557 **		
	4	0.355	0.507 *		0.432		
	5	0.417			0.626 **	0.557 **	
2	1						0.816 **
	2	0.391					0.788 **
	3	0.640 **		0.420			0.426
	5					0.745 **	0.400
3	1		0.529 *	0.500 *			0.365
	2						0.549 **
	3		0.373	0.623 **			
	4			0.755 **			
	5			0.790 **		0.378	
4	2	0.732 **					
	3	0.858 **		0.357			
	4	0.578 **		0.448 *			
	5	0.440 *		0.356		0.592 **	
5	1		0.831 **				
	2	0.357	0.825 **				
	4		0.833 **			0.420	
	5		0.413			0.825 **	

Key: * $p<0.01$; ** $p<0.001$

If we follow the ratings which present high saturations in every factor, we find that 3 of the dimensions (2, 3 and 5) are very well measured in the exercises of the Assessment Centre:

- All the ratings of dimension 5 (*Teamwork*) show high saturations in factor *F2*. There is no other factor with such significant saturations at $p=0.05$;
- All the ratings of dimension 2 (*Company and business awareness*) have high saturations in factor *F6*. There is no other factor with such significant saturations at value $p=0.05$;
- Four of the five ratings of dimension 3 (*Communication*) show high saturations in *F3*. There is no other factor with such high saturations for these ratings at value $p=0.05$.

All the ratings of dimension 1 (*Planning and organising*) show high saturations in factor *F4*, but four out of the five ratings (the ones obtained following exercises 2, 3, 4 and 5) present high saturations in *F1* also. Since this factor has high saturations for the ratings of dimension 4 also (*Decision-making process*), as obtained in exercises 2, 3, 4 and 5, it is possible for the scores given to dimension 1 during exercises 2, 3, 4 and 5 to reflect both the planning/organising and decision-making processes.

All the ratings of dimension 4 (*Decision-making process*) present high saturations in *F1*, but three of such ratings also have saturations in factor *F3* (referring to communication). Therefore, it is possible for the scores given to dimension 4 (*Decision-making process*) during exercises 3, 4 and 5 to reflect also the manner in which the decision made is communicated.

We further outlined the Comparison of the overall ratings means, within the Assessment Centre, as well as the Comparison of the means of the dimensions' overall ratings.

Comparison of the overall rating means, within the Assessment Centre

We employed the ANOVA method in comparing the overall rating averages (OAR) between companies, for every exercise and every dimension.

Table 13. Statistical indices for overall ratings (OAR), determined for every dimension, within every exercise, for every company

Exercise	Dimension	Company A		Company B		Company C		Company D	
		<i>m</i>	σ	<i>m</i>	σ	<i>m</i> ,	σ	<i>m</i>	σ
1	1	4.10	0.74	3.86	0.69	3.00	1.58	3.57	0.98
	2	2.40	0.70	3.29	0.49	3.22	1.09	1.86	0.90
	3	3.90	1.10	3.43	0.79	3.33	1.12	2.57	1.13
	5	3.60	1.07	3.57	0.53	2.67	0.87	3.00	0.58
2	1	3.70	1.16	3.86	0.38	2.78	0.67	3.00	0.82
	2	2.90	0.99	3.57	0.53	2.89	0.78	2.29	0.49
	3	3.50	1.35	3.43	0.98	2.89	1.05	2.86	0.69
	4	2.90	1.29	3.57	0.53	2.33	0.71	3.14	0.69
	5	3.40	0.84	3.43	0.53	2.22	0.83	3.00	0.58
3	1	3.10	0.88	3.29	0.49	2.11	0.93	3.29	1.38
	2	2.90	1.37	3.71	1.11	2.56	0.73	2.57	1.13
	3	3.50	1.27	3.43	1.13	2.67	0.71	2.43	1.27
	4	2.90	1.37	3.14	0.69	2.22	0.97	3.29	1.25

4	1	3.10	0.88	3.14	0.69	1.89	0.78	2.86	0.90
	3	3.10	1.45	3.14	1.07	2.56	1.01	2.43	1.27
	4	3.00	1.15	3.29	0.49	2.22	0.97	2.86	1.07
	5	3.00	0.82	3.29	0.76	2.33	0.71	2.71	0.76
5	1	3.20	1.03	4.00	1.00	2.33	0.87	3.86	0.90
	2	2.90	1.20	3.43	0.79	3.22	1.09	3.29	0.76
	3	3.50	1.08	2.86	1.07	3.11	1.05	3.29	0.95
	4	3.10	1.20	3.57	0.79	2.78	0.83	3.43	0.79
	5	2.80	0.79	3.00	0.82	2.56	0.88	3.29	0.49

The findings show that, in the majority of cases, the highest mean was obtained for company B and the lowest for company C, which clearly point out the existence of various differences between the companies.

Comparison of the means of the dimensions' overall ratings

For every dimension in part we determined the average of the overall ratings on that particular dimension, obtained during the exercises. Then we proceeded to a comparison of the means, per company, using the ANOVA method.

Table 14 below shows the statistical indices for the results: highest mean in companies B and A, and lowest in C and D.

Table 14. Statistical indices of overall ratings (OAR) for every dimension, in every exercise for every company

Dimension	Company A		Company B		Company C		Company D	
	m	σ	m	σ	m	σ	m	σ
1	3.44	0.70	3.63	0.52	2.42	0.76	3.31	0.76
2	2.78	0.90	3.50	0.38	2.97	0.67	2.50	0.75
3	3.50	0.98	3.26	0.72	2.91	0.81	2.71	0.65
4	2.98	0.95	3.39	0.38	2.39	0.76	3.18	0.80
5	3.20	0.70	3.32	0.61	2.44	0.75	3.00	0.43

The outcome of the comparisons is presented in Table 66.

For dimensions 1 (*Planning and organising*) and 5 (*Teamwork*) the arithmetic means differ considerably between the companies (at threshold $p=0.01$ for dimension 1 and at $p=0.05$ for dimension 5). When the difference between the means was considerable, we proceeded to a comparison of the companies'

means two by two, using the LSD method. In all these cases, said difference was generated by the low arithmetic mean, obtained by company C (Table 15).

Table 15. Comparison of the overall ratings averages between the companies, using the ANOVA method

Dimension	$F(3, 29)$	p	The companies among which the difference of the mean is considerable
1	5.050	0.006	A and C ($p=0.004$), B and C ($p=0.002$), C and D ($p=0.017$)
2	2.446	0.084	
3	1.546	0.224	
4	2.526	0.077	
5	3.087	0.043	A and C ($p=0.017$), B and C ($p=0.012$)

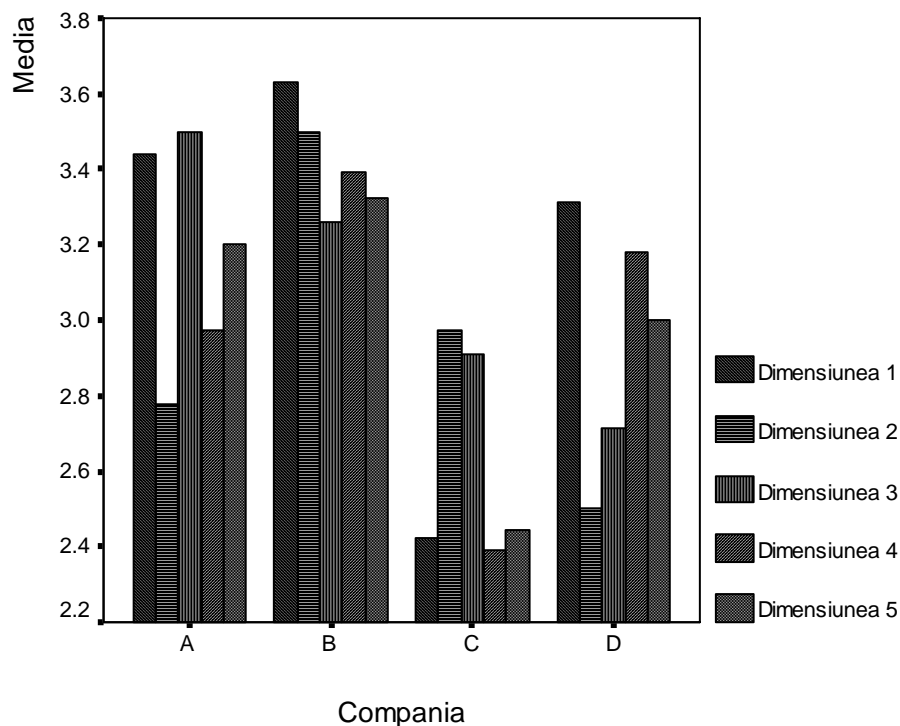


Fig. 2. The means of the dimensions' overall ratings, by company
 Dimension 1 = Planning and organising
 Dimension 2 = Company and business awareness
 Dimension 3 = Communication
 Dimension 4 = Decision-making process
 Dimension 5 = Teamwork

The residual differences between the companies, both in terms of arithmetic means for exercise, respectively for dimension, as well as in terms of dimensions prompted us to approach every company separately (Fig. 2).

We further proceeded to examine **the concurrent validity** and **the predictive validity** of the Assessment Centre. This study enhanced the link between the overall rating for a specific dimension (OAR) and the arithmetic average of the scores for the item in the *Appraisal Form*, corresponding to said dimension, in 2007 (for the concurrent validity) and years 2008 and 2009 (for the predictive validity). Since the number of individuals participating in the Assessment Centre was diminished in every organisation, we determined Spearman's rank correlation coefficient, instead of the linear correlation coefficient.

Table 16. Rank correlation coefficients (Spearman) between the dimensions and the items identified in the *Managerial Skills Appraisal Form*, which are significant at $p < 0.05$

Year	Company	Dimensions				
		D1	D2	D3	D4	D5
2007	A	0.754*	0.652*	0.873***	0.776**	0.676*
	B			0.852*		0.954***
	C			0.742*	0.684*	
	D					
2008	A	0.935***		0.910***	0.985***	0.649*
	B			0.982***	0.764*	0.895**
	C	0.830**			0.858**	0.869**
	D		0.934**		0.898**	
2009	A	0.867***		0.763**	0.948***	
	B	0.767*		0.937**	0.863*	0.982***
	C	0.687*		0.736*	0.798**	0.783*
	D	0.917**				

Key: *** $p < 0.001$; ** $p < 0.01$; * $p < 0.05$.

In company A, all the dimensions present a good concurrent validity (there is a significant correlation at $p = 0.05$ with their respective items from the *Appraisal Form*). However, in company D there is no such validity.

An analysis of the correlation coefficients determined for 2008 and 2009 reveals that, for company A, there are four dimensions with good predictive validity for a period of one year and three dimensions with good predictive validity for a period of two years. In turn, in company D there are only two dimensions with

good predictive validity over one year and just one dimension with such good validity for a period of two years.

The predictive value in company D is low. This fact might be determined by the company's traits, as it is a company acquired from the State using the MEBO method (takeover by the management and employees), currently with private equity. However, the company has not yet converted to the result-oriented organisational culture and the employee assessment and reward policies are still biased. Therefore, even if the appointment of the operations director took into account the results obtained in the assessment centre, the actual employee appraisal process during the two consecutive years was based on different criteria.

CASE STUDY: CONCLUSIONS

The purpose of this thesis is to design an instrument that can be employed in managerial screening and selection processes, in a general context that underlines (yet again) job performance. Given the activity it involves, the managerial function has the strongest impact on an organisation. The Romanian companies have already grown out of the period when the applicants hired would meet a minimum of the job requirements. The new approach in employee selection, in particular managerial screening, focuses on ensuring that once hired and part of the company, the individual will be successful at his job. The method used has to meet several requirements: to have face validity, as applicants should find it relevant for their target job; the time allocated to the application and interpretation of data should cut back the duration of a selection process; to measure those performance-related competencies and implicitly, have predictive validity.

The need to predict the behaviour and performance of the new employee generated a new approach among the recruiters (whether internal or external to the organisation): a long term relationship with applicants and by default, tracking of the results, in such a manner as to ensure that the information given during a feedback session helps the development of said process and sustains the formation of a pool of potential candidates for various other jobs and positions within the organisation, regardless whether they actually are current company employees or not (Smith & Mazin, 2004).

Under these conditions, the Assessment Centre is considered to be one of the methods with high predictive value, if all the steps in its development and implementation are properly completed, as provided by the substantial literature on the subject for the past 10, 15 years.

Consequently, in compliance with the outcome of the case study, **we may conclude the following:**

1. The inter-rater agreement within the Appraisal Form in 2007 was analysed and determined with the help of Kendall's τ_B coefficient; the agreement of the rates given by the assessors to the items in the Form is better in companies A and C – where there are more items for which more than half of the subjects received the same score from the two raters and there are more items for which the arithmetic mean at absolute value of the score differences is lower than 1 – and rather low in company D (where the third assessor gave a different performance than the other two).

2. The outcome of the comparison between the arithmetic means, by company (2007) show in circa two thirds of the cases (12 out of 19) that said means differ considerably between companies (at $p=0.05$). When the difference between the means was considerable, we proceeded to a comparison of the companies' means two by two, using the LSD method. For every item where the score means differed significantly by company, between organisation B and C the difference was significant at least at $p=0.05$.
3. Inter-rater agreement for both 2008 and 2009 is good in all companies, which added to the loyalty.
4. Given all the results obtained, we may use the Appraisal Form as a reliable criterion in order to track the subjects' evolution. This Form has a high degree of trustiness.
5. We ensured the content validity of the Assessment Centre by following the correct steps in its design, according to the *Guidelines and Ethical Considerations for Assessment Center Operations* (2009), as well as by carrying out the survey, with the support of the 14 managers, with the view to identify the competencies normally required for a successful director of operations.
6. Based on the data collected from all the subjects, following the use of the Assessment Centre method, we obtained a high level of face validity.
7. From all the linear correlation coefficients determined for the results of the assessment exercises, only one is insignificant at the value of $p=0.05$ (for dimension 2, exercises 1 and 5), and half of them (19 out of 38) are significant at $p=0.001$. Thus we conclude that the dimensions have been correctly defined and we have a very good convergent validity.
8. From a total of 38 correlation coefficients (linear correlation between the ratings in an exercise), only 6 are insignificant at $p=0.05$, whereas 14 coefficients (which is more than a third) are significant at $p=0.001$. The correlations tend to be lower for exercise 1 and higher for exercise 4 (where all the correlation coefficients are significant at least at $p=0.05$). We thus have low discriminant validity, which actually occurs often in Assessment Centres studies (Arthur & Co., 2000, Arthur & Co., 2003).

9. In order to confirm the construct-related validity of the Assessment Centre, we processed the results obtained from the dimensions' assessment during the exercises (OAR) by factor analysis (the Principal Component Method and the Varimax Rotation Method). The 6 factors we drew out cover 79.200% of the total variation ($F1:16.636\%$; $F2:15.208\%$; $F3:12.904\%$; $F4:11.623\%$; $F5:11.550\%$; $F6: 11.279\%$), confirming that three dimensions (2, 3 and 5) were very well measured during the assessment exercises, and dimensions 1 and 4 have high saturations in other factors too.
10. The comparison of overall rating means (OAR) by company, for every exercise and every dimension, using the ANOVA method, revealed differences between the companies, which prompted us to examine every such organisation distinctively.
11. The comparison of the dimensions' overall ratings means, by the ANOVA method also revealed major differences between the companies. This constituted our second reason to study every one of them separately from the other.
12. The raters' score agreement, pointed out by Kendall's τ_B coefficient, had a positive value and was statistically significant at $p=0.001$. The calculation of α coefficient in order to examine the Centre's inter-rater agreement reaches very high values (≥ 0.858), in 19 out of 22 rating situations being higher than 0.900, which confirmed a very good agreement between the four raters. This fact ensures the trustiness of the Assessment Centre.
13. To obtain the concurrent validity we calculated Spearman's rank correlation coefficient, for the dimension's overall ratings and the arithmetic means of the scores of the corresponding items in the Appraisal Form, in 2007. Results revealed that company A presents a good concurrent validity for all dimensions (significant correlation at value $p=0.05$ with the corresponding items in the Form), whereas company D has no such validity.
14. To obtain the predictive validity, we determined the rank correlation for a period of one year (2008), respectively two years (2009). The criterion used was the Managerial Skills Appraisal Form, containing 19 items. However, we employed only 5 of said items, to correlate with the 5 dimensions of the Assessment Centre: Integration abilities, activation as a group member, Communication skills, Decision-making abilities, Organisational skills and Productiveness: results,

products. In company A all the dimensions had a very good concurrent validity (there is a significant correlation at $p=0.05$, with the corresponding items in the Form), but in company D there is no concurrent validity. The analysis of the correlation coefficients, determined for 2008 and 2009 pointed out that in company A there were four dimensions with good predictive validity for a period of 1 year, and three dimensions with such validity for a period of two years. In turn, in company D, only two dimensions had good predictive validity for one year and just one dimension for two years.

15. The predictive validity for company D is low. This fact might be determined by the company's traits, as it is a company acquired from the State using the MEBO method (takeover by the management and employees), currently with private equity. However, the company has not yet converted to the result-oriented organisational culture and the employee assessment and reward policies are still biased. Therefore, even if the appointment of the operations director took into account the results obtained in the assessment centre, the actual employee appraisal process during the two consecutive years was based on different criteria.
16. The Assessment Centre we designed may be successfully used in organisations such as A, B and C, more specifically where both employee performance and its assessment take into account performance indices with a high degree of objectivity.

PERSONAL INPUT

This paper underlines the novelty of an Assessment Centre designed and implemented for the managerial positions in a production facility. We focused on highlighting the essential competencies of a proficient performer and thus we demonstrated the Assessment Centres predictive value within certain kinds of organisations.

The development of such Assessment Centres, used during personnel screening and selection procedures, for various positions, based on certain key dimensions, would provide us with sufficient basis to prompt for a broader utility of such centre as a selection instrument. In time, the cost implied by its development would be offset against its usefulness.

CASE STUDY: LIMITATIONS

The specific design and the outcome revealed in this study allow us to employ the Assessment Centre for companies such as types A, B and C. In order to further cover organisations type D, the centre's design should account for other dimensions, which would mix with the organisation's values more than with the objective performance markers.

FURTHER DIRECTIONS FOR THE CASE STUDY

Given the results we obtained herein, we believe that extending the use of assessment centres as selection tools to other fields may be construed as a solid direction for continuing this study. There are areas where managerial selection doesn't take into account the activity which will be carried out by the person hired. On one hand, this induces a shortage of applicants altogether, that might be able to make a difference in that position. On the other hand it determines the appointment of certain individuals, who have different expectations and will thus yield different results than the markers later tracked and desired. In Romania, the fields that have so far remained "untouched" by the method of assessment centres are: research, education and public administration.

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