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Validation of Cameron and Quinn's Organizational Culture Assessment Instrument (OCAI) in Polish conditions

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Abstract:

Aim: The main aim of the paper is validation of the OCAI questionnaire with the study providing the framework for estimating psychometric parameters (accuracy, reliability, discriminatory power) and devising standards which will allow for a correct and clear interpretation of scores, thus forming the basis for assessment of the possibilities of using the OCAI in Polish conditions.

Research method: In the validation work, the Polish version of Cameron and Quinn's OCAI questionnaire was used. While selecting the validation sample, a targeted strategy was adopted, whereas in relation to the standardized sample it was partially targeted and incidental. The validity test was performed based on factor analysis and examining correlative relationships between the OCAI scales and the constructs which were to some extent related conceptually. Reliability was estimated using Cronbach's Alpha. Discriminatory power of the items of scales was calculated by correlating the items with the overall scale scores and by comparing variances of extreme quartile groups. The possibility of standardization was estimated through the K-S test.

Findings: The validation study confirmed the conceptual correctness of the construct of Cameron and Quinn's Competing Values Framework. The structure of the OCAI questionnaire produced on the basis of the Polish research sample is consistent with the assumptions of its creators. The questionnaire has appropriate psychometric properties in terms of accuracy, reliability and discriminatory power. The distributions of the OCAI scale scores do not deviate significantly from the character of the normal distribution, and, depending on the potential user's preferences, it is possible to apply percentile standards or standard tens.

Originality / value of the paper: The tests presented in the paper confirm methodological and conceptual validity of the OCAI tool which is among those tools which are quite frequently used in research on organizational culture. The potential user of this questionnaire can carry out research in the knowledge that the questionnaire has adequate psychometric properties and that it was verified in Polish conditions. The system of standards that was generated makes the scores largely more precise so one can indicate their exact level against a selected population of persons employed in Polish organizations, which in turn produces favorable conditions for drawing correct conclusions as to the relevant recommendations, including their correct formulation. It is also possible to compare the score scales with those produced by other tools with the same system of standards.

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Implications of the research: The psychometric verification of the OCAI questionnaire produces a range of possibilities for the research centered on the issues surrounding organizational culture because the research draws on the knowledge that it can be conducted employing a tool that was tested and proved useful also in Polish conditions. Members of the contemporary research community want increasingly more often to carry out studies using tools that have been objectively and quantitatively justified. In the long run, the OCAI can be employed to identify causal relationships between the phenomena of organizational culture and the factors that are interdependent with this culture, such as management styles or motivational psychological aspects.

Limitations of the research: Although the validation study was conducted with differentiated samples, they did not fulfill the requirement of full representativeness for the entire Polish population, which means that the conclusions drawn by a potential user of the validated version of the OCAI should be marked by a cautious and balanced approach. The validation works on the questionnaire are still preliminary and they will require to be confirmed by further research. The percentile and ten standards generated are temporary and general in their nature. Moreover, the significance of differences has not been explored between the individual subgroups of the research sample and in the future what will be necessary is a statistical verification in the context of creating separate standards depending on such variables as type of work, level or industry within which organization functions.

Keywords: Organizational culture; Competing Values Framework; OCAI questionnaire; validation.

JEL**:** M12, M51, M52

1. Indroduction

In the area of globalization, integration and migration of population of today's Europe the interest taken in the human factor is of key importance in the context of efficiency and predictability of resources of an organization. Although it has been almost 30 years since Poland's political transformation, with domestic scientific achievements being enhanced by a considerable number of new foreign solutions, methods and tools, knowledge on human functioning in work environment continues to appear limited and if explored, then only to a small degree. While owners or heads of organizations have certain possibilities of exerting influence on how the work environment and work conditions are shaped, what still remains important, while being little controllable, is the issue of how employees perceive events and phenomena unfolding in firms, as well as how individual work situations are interpreted and what meanings are attached to them.

One of the crucial parameters, which are also difficult to measure, characterizing the qualities of organizational environment is the identification of organizational culture located in indirect and intermediate surrounding environment, as well as within the institution itself. Managing organizational culture seems to be characterized by strong limitations as many factors contributing to the creation of this phenomenon are located beyond the very organization and the influence of people who manage it. This, however, does not limit the possibilities of identifying the type and characteristics of organizational culture within which framework a particular firm functions. To

this end, various proposals, models and tools are used, but only some of them are subject to in-depth validity tests and have adequate psychometric parameters. Employing proven diagnostic tools for identifying the properties of work environment allows sound and reliable conclusions to be produced by scientific research, while practitioners can formulate accurate recommendations and strategies for changes.

The object of the paper is validation of one of the most frequently used tool by the research community, which is the OCAI developed by Cameron and Quinn based on the concept of Competing Values Framework, with the tool being employed for identifying the types of organizational culture. Furthermore, the paper considers the possibilities of using the tool in Polish conditions as an instrument equipped with adequate psychometric parameters.

2. Essential features of the Competing Values Framework and the OCAI

The OCAI questionnaire was devised by American scholars Cameron and Quinn who define organizational culture as a set of specific organizational values, which are taken for granted, underlying assumptions not necessarily communicated verbally, as well as shared interpretations, expectations and memories of situational factors [Cameron K., Quinn R., 2015, pp. 23-26]. Among the roles played by organizational culture, the researchers indicate the following: to systematize and further specify prevailing views, sustain the stability of the social system and to identify guidelines for behavior which function in an organization although people are not aware of them. What informs the theoretical assumptions of the OCAI questionnaire is the Competing Values Framework proposed by the cited authors. According to this framework, there are two key dimensions at opposing extremes in the organizational environment: 1) flexibility and discretion vs. stability and control; 2) internal focus and integration vs. external focus and differentiation. The relationship between these dimensions is competitive and conceptually conflicting. The outcome of the interactions between these two dimensions is the process which gives rise to the following four potential types of organizational cultures: clan, adhocracy, market and hierarchy. Cameron and Quinn emphasize that the scores of the OCAI scales for those individual types may be at very differentiated but also at very similar levels, which means that it is not always possible to identify

a dominant type of organizational culture. A brief characteristic of those cultures is included in Table 1.[1]

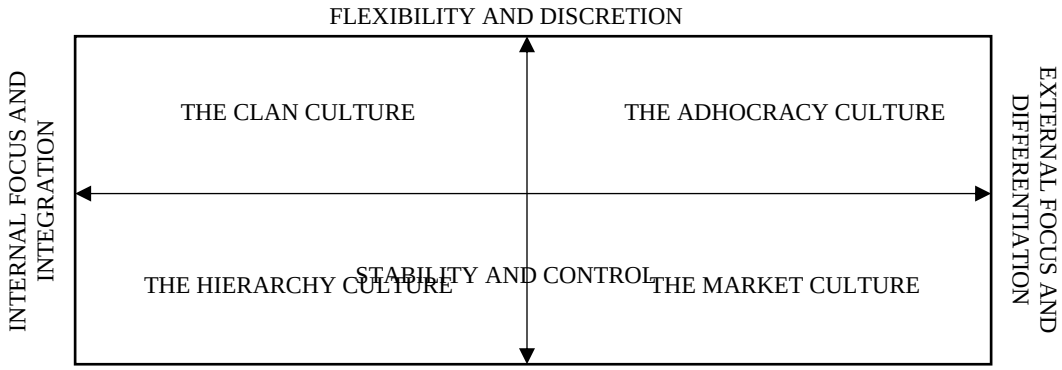

Figure 1. Competing Values Framework
Source: Cameron K., Quinn R., 2015, p. 40

Table 1. Characteristics of organizational cultures according to Cameron and Quinn's concept

Type of organizational culture	*Characteristics of organizational culture*
THE CLAN CULTURE	• It is similar to a family-type organization in which people live and function like in a harmonious family • It is centered around emotional ties, friendly work atmosphere, shared values and goals • A high level of work participativeness, a sense of community and cohesion • Leaders delegate powers, encourage to participativeness, commitment and loyalty. They play the role of advisors and mentors who are concerned about people and their needs, they ensure there is a sense of trust and high morale • Teamwork, commitment and employees' sense of responsibility for the organization's future. • Priorities: partially independent work teams, with team outcomes being favored over individual achievements • The organization's cohesion is ensured by loyalty, tradition, respect, strong ties.
THE ADHOCRACY CULTURE	• Emphasis put on innovation in an era of information and unpredictable changing conditions • It is centered around task teams that are ad hoc appointed and dynamic which are disbanded after the task has been accomplished • Emphasis on creating visions of the future, taming anarchy and imagination that is given free rein but still disciplined • Leader should be a visionary, innovator and risk taker. There is no centralized power nor authority-based relationships. Power is transferred depending on what is currently being worked on.

[1] Detailed information of the Competing Values Framework, the OCAI tool and the interpretation of the four type of cultures can be found in Cameron and Quinn's publication cited in the references.

	• The following is pronounced: adaptability, creativity, non-stereotyped solutions, calculated risk • Priorities: flexibility, development of products and services, anticipating the future, entrepreneurship, creativity, quest for innovative solutions • Success is associated with being able to create unique and revolutionary products and services
THE MARKET CULTURE	• Organization operates as a "market", strong external focus • It is centered around results, profit and task implementation • Leaders are hard drivers, ruthless and demanding. They encourage the staff to aggressive competition • Employees are ambitious, success oriented • What is pronounced is the leader position and defeating competition • Priorities: winning by the factor that glues the firm, success is associated with the market share and market penetration • The organization's market success need not go hand in hand with social, humanistic success, and a team that is integrated and marked by mutual trust. Demonstrations of predatory characteristics and ruthlessness are possible, which may undermine the image as a trustworthy and credible organization • The organization perceives the surrounding environment as hostile, consumers as demanding and fastidious while maintaining its market position as a key element
THE HIERARCHY CULTURE	• Highly formalized and hierarchically structured • Emphasis on functioning according to job description, organizational rules and strict instructions for work processes • Leaders make decisions and consider options in terms of how to act, options for work behaviors are minimal • A model leader is a coordinator and organizer who is efficiency-oriented • A pronounced role of decision-making centers, centralized decisions, standards, procedures, mechanisms for accounting for results is perceived as a key to success • Priorities: a smooth-running organization, stability, productivity, no work distortions, predictability, clinging to rules rigidly • Unpredictable, risky and competitive market can destroy the fixed scenarios, break the rules and thus lead to failure

Source: Cameron K., Quinn R., 2015, pp. 41-49.

The OCAI questionnaire developed by Cameron and Quinn is aimed at identifying the levels of the types of different organizational cultures, or, if possible, the dominant type for a given institution. The tool is composed of 6 separate parts encompassing 4 items each over which the respondent is to divide an equal sum of 100 points for each part. The next step involves averaging the total scores for the 6 items for each type of the culture and present them in a graph. Although, as Cameron and Quinn assure, the tool has been verified numerous times for psychometric parameters, there is still not much information on specific validation and psychometric data. Nor

has the author of the present paper found information in the Polish scientific output on validation of the OCAI tool. Annex 1 contains the Polish version of the analyzed questionnaire.

3. Characteristics of validation sample and standardization sample

The considerations presented in this paper are concerned with the in-depth studies carried out by the author throughout the years 2014-2017 on the issues centered around organizational climate, organizational culture and factors influencing these phenomena. Some of those studies were devoted to diagnosing new or already created tools which, however, had not been verified in terms of psychometric qualities. Total research samples were quite large and, depending on the specificity and the scope of the analyses to be conducted, encompassed several hundred to several thousand respondents. For the studies on organizational culture, the author also included (apart from the results elicited which were used in validation procedures) overall results (scores for the scales of the organizational culture types) produced by other researchers or made available by persons from various organizations under the confidentiality clause and on condition of not revealing information as to where those results had been generated.

The sample involved in the validation study of tools for measuring the types of organizational cultures was targeted and consisted of 320 respondents. On the one hand, the author was set on having an adequate number of respondents and, on the other, on having the group to be diagnosed relatively differentiated. What was followed in this respect was the concept of sample selection developed earlier by the author within the framework of extended validation and empirical studies on organizational climate (see and cf. Wudarzewski G., 2014). In the Polish practice, conducting a survey with fully representative samples is hampered because of the considerable limitations in terms of having the same opportunity of reaching all participants of the population. It is not seldom that even institutions specialized in designing psychometric tools such as Psychological Tests Laboratory do not carry out research with fully representative samples but only with selected groups evincing adequate proportions, with the character of the samples being targeted or incidental (see and cf. Wudarzewski G., Wudarzewski W., 2017 and literature indicated therein). In terms of the size of samples in validation studies, the views tend to vary; however, the practice and experiences of the author as well as other researchers show that groups of about 300 respondents can produce relatively reliable psychometric information (see and cf. Wudarzewski G., 2014). While differentiating the validation sample, it is important to consider demographic

differences (e.g. gender, age, place of residence) and to carry out the survey employing a variety of perspectives. Another significant factor when selecting the sample was the author's intention of comparing the elicited results with those produced by the earlier research, which is why it was decided to adopt a targeted strategy when selecting the validation sample (informed, quantitative search for an adequate number of respondents with specific demographic variables). Given the limitations in terms of access to the entire population, employees from the following provinces were taken into account: Lower Silesia, Śląskie Province, Opolskie Province and Wielkopolskie Province. The basic requirement for being included in the sample was that respondents were employed either on a permanent or casual basis. The structure of the validation sample is presented in Table 2.

Table 2. Characteristics and the structure of the validation sample

Sample structure by gender	Sample structure by age	Sample structure by the type of work	Sample structure by the level in organization	Sample structure by employment in province
women: N=180	***youth (age 17-19):*** N=12	***Manual-contracting work :*** N=45	***Employees:*** N=190	***Lower Silesian Province:*** N=185
	students (aged 20-24): N=19			
	employees (age 25-34): N=110	***Work involved in trade, sales and customer service:*** N=130		
	employees (age 35-44): N=141			***Wielkopolskie Province:*** N=30
		Office work, economic and administrative work: N=115		
men: N=140	***employees (age 45-54):*** N=20		***Executives of medium and lower levels*** N=70	***Śląskie Province:*** N=55
	employees (age 55-60): N=10	***Engineering-technical work:*** N=30	***High level executives and owners:*** N=60	***Opolskie Province:*** N=50
	employees (over 60 years old): N=8			

Source: self-reported data.

A slightly different, although similar, characteristics showed the standardization sample of N=933, providing basis for generating standards so as to be able to convert and interpret the scores elicited by the OCAI users. Here, the author used the scores produced by the studies conducted by other people. The key role in the standardization study was played not so much by the detailed scores elicited from the OCAI questionnaires and from the answers given to specific items, as by the overall scores calculated for the scales-types of cultures stemming from Cameron and Quinn's concept. To this end, the available contacts with other researchers, managers and operational staff from organizations located across different provinces were used, and thus the selection strategy for the standardization sample was in its nature partially targeted and incidental. While transferring the scores produced through the OCAI measurements, only the overall scale scores were, by definition, included, since the author did not have detailed answers in an electronic form and because of the already mentioned confidence clause under which it was not permitted to transfer information on where those scores were generated (employees of various organizations did not give their consent to make publicly available detailed answers or the name of the institution). Approximate timeframe for the OCAI measurements used in the standardization process covered the years 2010 -2017. The detailed structure of the sample used for standardization is presented in Table 3 below.

Table 3. Characteristics and the structure of the standardization sample

Sample structure by gender	Sample structure by age	Sample structure by the level in organization	Sample structure by employment in province
women: N=460	***employees (age 17-40):*** N=547	***Employees:*** N=540	**Lower Silesian Province:** N=423
			Śląskie Province: N=154
	employees (age 41-50): N=310		**Opolskie Province:** N=105

nem: N=473			**Wielkopolskie Province:** N=77
		Executives of medium and lower levels : N=223	**Małopolskie Province:** N=56
	employess (over 50 years old): N=76		**Mazowieckie Province:** N=48
		High level executives and owners N=170	**Kujawsko-Pomorskie Province:** N=31
			Łódzkie Province: N=39

Source: self-reported data.

The sample of the smallest size of N=137 was involved in multifaceted and in-depth studies within the framework of which the same respondents were diagnosed concurrently by using several tools as to how they assessed the different types of organizational cultures and the phenomena that were partially related such as: job satisfaction, organizational climate, pathological phenomena or mobbing in workplace. The author conducted the survey on employees of Lower Silesian organizations mainly on the basis of their availability.

4. Validity analysis of the OCAI

The first validity calculations on the OCAI referred to the verification of the questionnaire structure, of exploratory analysis and internal validity. To this end, factor analysis and Varimax rotation were used. In validation studies, this procedure is relatively frequently employed; however, the identification of the type of organizational culture through the OCAI is quite particular in that filling in the questionnaire by respondents consists in dependent estimation (division of 100 points per 4 possible answers), which means that while giving points to one answer, one “takes away” the potential points from the other answers. This, in turn, is not irrelevant for the results produced by the factor analysis. The major questions in this situation were concerned with the following issues:

which parameters (scales-types of cultures) will be compared with each other, in what configuration will they be compared and how many factors would automatically be isolated on the basis of the validation sample results? The first validity calculations were conducted for the OCAI scores at the level of scales using Varimax rotation. Detailed scores are presented in Table 4 below:

Table 4. Factor analysis results estimated at the OCAI scale-level with Varimax rotation

OCAI scales considered in the study	Factor 1	Factor 2
The CLAN CULTURE scale	**0,794**	0,265
The ADHOCRACY CULTURE scale	0,213	**0,767**
The MARKET CULTURE scale	**-0,948**	0,104
The HIERARCHY CULTURE scale	0,069	**-0,950**
Response variance	1,579	1,574
Share in variance	0,394	0,393

Source: self-reported data using Statistica program (version 12).

The factor analysis distinguished two areas within which relatively strong factor loadings occurred with the direction contributing to the factor (positive loading) and the direction weakening the factor (negative loading). The above results largely confirm the theoretical premises of Cameron and Quinn's Framework of Competing Values, where the first major dimension "flexibility, internal focus and integration vs. stability, external focus and differentiation" takes into account the scales at extreme opposites: the clan culture and the market culture; and the second dimension "flexibility, internal focus and differentiation vs. stability, internal focus and integration" encompassing at its opposites the adhocracy culture and the hierarchy culture. These two comparisons of the types of cultures as belonging to one dimension while being at the same time mutually opposite are in line with the general OCAI concept – the factor analysis compared with one another the opposing results for those types of cultures which, according to Cameron and Quinn's concept, were to be at the opposing extremes.

The validity test showed quite clearly a 2-factor structure of the OCAI tool and it was for this structure that a detailed factor analysis with Varimax rotation was carried out at the level of items of the questionnaire validated. Detailed results of the study are contained in Table 5.

Table 5. The factor analysis results estimated at the level of the OCAI items with Varimax rotation

OCAI scales considered in the study	Factor 1	Factor 2
Item 1a – CLAN CULTURE scale	0,136	**0,554**
Item 1b - CLAN CULTURE scale	0,134	**0,585**
Item 1c - CLAN CULTURE scale	0,114	**0,579**
Item 1d - CLAN CULTURE scale U	0,157	**0,694**
Item 1e - CLAN CULTURE scale	0,213	**0,653**
Item 1f - CLAN CULTURE scale	0,163	**0,699**
Item 2a – ADHOCRACY CULTURE scale	**0,660**	0,181
Item 2b - ADHOCRACY CULTURE scale	**0,642**	0,021
Item 2c - ADHOCRACY CULTURE scale	**0,597**	0,015
Item 2d - ADHOCRACY CULTURE scale	**0,700**	0,225
Item 2e - ADHOCRACY CULTURE scale	**0,709**	0,120
Item 2f - ADHOCRACY CULTURE scale	**0,630**	0,117
Item 3a – MARKET CULTURE scale	0,021	**-0,476**
Item 3b - MARKET CULTURE scale	-0,233	**-0,687**
Item 3c - MARKET CULTURE scale	0,054	**-0,714**
Item 3d - MARKET CULTURE scale	0,157	**-0,680**
Item 3e - MARKET CULTURE scale	0,055	**-0,695**
Item 3f - MARKET CULTURE scale	0,125	**-0,567**
Item 4a – HIERARCHY CULTURE scale	**-0,545**	-0,131
Item 4b - HIERARCHY CULTURE scale	**-0,330**	0,221
Item 4c - HIERARCHY CULTURE scale	**-0,653**	0,152
Item 4d - HIERARCHY CULTURE scale	**-0,746**	-0,096
Item 4e - HIERARCHY CULTURE scale	**-0,713**	0,108
Item 4f - HIERARCHY CULTURE scale	**-0,615**	-0,045
Response variance	5,126	5,086
Share in variance	0,213	0,211

Source: self-reported data using Statistica program (version 12).

The results above show the loading force of the individual OCAI items and provide further details on the previous analysis. Most of the factor loadings are above average or high in the desired arrangement of relationships, with those results being linked to relatively low impact indicators in undesired arrangements. According to the results, the study on internal validity of the OCAI

questionnaire confirms the theoretical premises of the Framework of Competing Values and shows relatively adequate psychometric qualities in terms of the validated tool.

The second method for estimating validity of the OCAI questionnaire was the analysis of conceptually convergent and discriminant validity, as a concurrent measurement was conducted with a separate sample of 137 employees of Lower Silesian organizations employing the OCAI questionnaire together with such tools as MSQ, WIPKO, OCE, R&B, NAQ, ORM[2], and another tool for measuring organizational culture designed by Harrison and Handy. The tools mentioned are used for measuring, respectively: job satisfaction, organizational climate, the incidence of negative phenomena and mobbing risk, as well as to define the type of organizational culture (power, role, task, person culture). Each of these areas is partially related to the OCAI types of cultures; however, these are not the same constructs, and that was the purpose of the correlative verification. The diagnosis of the above mentioned phenomena was carried out over the period of consecutive days with a distance of two weeks in between – the author's assumption while carrying out the study was to do it within a possibly short timeframe so as to ensure the similarity of the organizational situations and circumstances. Detailed scores of the correlation between those parameters are presented in Tables 6 and 7.

Table 6. r-Pearson's correlation results between the OCAI scale scores and selected organizational phenomena

OCAI scales	MSQ	WIPKO	OCE	R&B	NAQ	ORM
CLAN CULTURE	0,355	0,218	0,342	0,402	-0,524	-0,346
ADHOCRACY CULTURE	0,113*	0,178	0,102*	0,215	-0,137*	-0,282
MARKET CULURE	-0,200	-0,169	-0,318	-0,281	0,399	0,286
HIERARCHY CULTURE	-0,216	-0,162*	-0,064*	-0,241	0,192	0,220

* for p>0,05, other values p<0,05
Source: self-reported data using Statistica program (version 12).

[2] Full name of the tools: (Multidimensional Measurement Inventory of Organizational Climate); Organizational Climate Exercise; Rosenstiel and Bögel's Organizational Climate Questionnaire; Negative Act Questionnaire; Mobbing Risk Assessment.

Table 7. r-Pearson's correlation results between the OCAI scale scores and the scales of the tool by Harrison and Handy

OCAI scale	powerr culture	role culture	Task culture	person culture
CLAN CULTURE	-0,482	-0,305	0,438	0,325
ADHOCRACY CULTURE	-0,363	-0,114*	0,281	0,149*
MARKET CULTURE	0,395	0,163*	-0,341	-0,182
HIERARCHY CULTURE	0,258	-0,301	-0,249	-0,216

* for p>0,05, other values p<0,05
Source: self-reported data using Statistica program (version 12).

The study on convergent and discriminant validity confirmed that the scores for OCAI scales are partially or slightly related to the scores for job satisfaction, the other types of organizational cultures, organizational climate or negative phenomena and mobbing, although the correlations trends and directions indicate expected, presumed qualities (e.g. the clan culture is negatively correlated with the incidence of negative phenomena, the clan culture is negatively correlated with power culture, the clan culture is positively correlated with person culture). In the context of the validation procedure of the OCAI, there is no risk that this tool is too closely related to the other proposal of measuring organizational culture by Harrison and Handy, or that it measures directly other related phenomena such as satisfaction, climate or pathological phenomena. This largely provides the basis for arguing that the OCAI scales are in their nature relatively distinguishable compared to the parameters discussed, although in the future it still might be worth conducting detailed research on this issue with an extended sample.

5. Reliability analysis of the OCAI

In the procedure for verifying a tool, one of the most important validation tests is reliability assessment which produces information on how accurately and reliably a particular questionnaire measures the qualities discussed. Also in the case of this analysis it is important to highlight the procedure for a dependent estimation in the OCAI questionnaire and the presence of contradictory and competing areas. In this situation, the tool discussed, by the very definition, does not examine such quality like one overall score of organizational culture composed of several intertwined

components, but it somewhat explores the four areas, types-scales of organizational cultures between which conceptual contradictions unfold. In a similar situation, Witkowski and Ilski, while validating Belbin team roles questionnaire, measured reliability separately for individual scales, disregarding by definition the measurement of reliability of the entire text (Witkowski S., Ilski S., 2000, pp. 47-64). The problem of interdependencies between item scores pertains to each of the six parts of the OCAI, while comparing items separately for each type of the culture does not have a dependent nature and if so, Cronbach's Alfa[3] can be used in the reliability estimation. The scores for the reliability estimation of the OCAI are presented in Table 8. They confirm quite clearly that for each type of organizational culture, the items compared jointly are translated into satisfactory and desired psychometric parameters. Cronbach's Alpha reliability indicator for each OCAI scale, although at differentiated levels, was over 0,7, in accordance with the recommended Nunnally criterion (see and cf. Brzyski P. et al. 2003; pp. 695–697). The detailed reliability analysis for determining Cronbach's Alpha indicator for each scale in a situation when different items are removed from the scale is presented in Table 8 in the column "Cronbach's Alpha after item removal." Virtually in each case, the selection of items was confirmed.

Table 8. The results of the analysis of reliability and discriminatory power of the OCAI scales and items

Items of individual OCAI scales	Cronbach's Alpha after item removal
Item 1a – CLAN CULTURE scale	0,826
Item 1b - CLAN CULTURE scale	0,817
Item 1c - CLAN CULTURE scale	0,823
Item 1d - CLAN CULTURE scale	0,798
Item 1e - CLAN CULTURE scale	0,806
Item 1f - CLAN CULTURE scale	0,810
Item 2a – ADHOCRACY CULTURE scale	0,837
Item 2b - ADHOCRACY CULTURE scale	0,840
Item 2c - ADHOCRACY CULTURE scale	0,861
Item 2d - ADHOCRACY CULTURE scale	0,831

[3] Correctness of the reliability procedure and Cronbach's Alpha indicator in the OCAI validation was consulted with dr. Pere Joan Ferrando Piera, a psychometrist at the Psychology Faculty of Rovira i Virgili University. The scholar is involved in creating software for applications used in psychometry, e.g. POLYMAT-C and FACTOR. The correctness of the analysis was also confirmed by Polish psychometrists.

Item 2e - ADHOCRACY CULTURE scale	0,833
Item 2f - ADHOCRACY CULTURE scale	0,845
Item 3a – MARKET CULTURE scale	0,785
Item 3b - MARKET CULTURE scale	0,775
Item 3c - MARKET CULTURE scale	0,744
Item 3d - MARKET CULTURE scale	0,744
Item 3e - MARKET CULTURE scale	0,737
Item 3f - MARKET CULTURE scale	0,775
Item 4a – HIERARCHY CULTURE scale	0,742
Item 4b - HIERARCHY CULTURE scale	0,795
Item 4c - HIERARCHY CULTURE scale	0,697
Item 4d - HIERARCHY CULTURE scale	0,686
Item 4e - HIERARCHY CULTURE scale	0,680
Item 4f - HIERARCHY CULTURE scale	0,735
Reliability score for the CLAN CULTURE scale: 0,839 Reliability score for the ADHOCRACY CULTURE scale: 0,864 Reliability score for the MARKET CULTURE scale: 0,792 Reliability score for the HIERARCHY CULTURE scale: 0,761	

Source: self-reported data using Statistica program (version 12).

The only exception is the score for the second item of the "hierarchy culture" scale (item 4b) whose removal should slightly improve the scale reliability. However, considering a very small potential increase in the reliability indicator (already at that moment quite high) for its scale, the assumption was adopted not to break the structure of the OCAI questionnaire, to maintain the arrangement in which each scale is measured by the same number of items and ultimately to leave the OCAI structure intact in the version proposed by Cameron and Quinn (Cameron K., Quinn R., 2015, pp. 30-35).

6. The analysis of discriminatory power of the OCAI items

Another stage of the validation tests was the analysis of discriminatory power of the OCAI items, which was performed using two independent methods – the measurement of the correlation between the test item and the score of the scale corresponding to the item (omitting this item in the scale scores) and the comparison of the variances of extreme quartiles using t-Student test

(Witkowski S., Ilski S, 2015). The result produced for the discriminatory power analysis is presented in Table 9.

Table 9. The results of the discriminatory power analysis of the OCAI scales and items

Item of individual OCAI scales	Item-scale score correlation	T	t-section	p
Item 1a – CLAN CULTURE scale	0,548	-24,408	-	0,000
Item 1b - CLAN CULTURE scale	0,599	-23,724	-	0,000
Item 1c - CLAN CULTURE scale	0,581	-27,851	-	0,000
Item 1d - CLAN CULTURE scale	0,689	-32,981	-	0,000
Item 1e - CLAN CULTURE scale	0,658	-27,352	-	0,000
Item 1f - CLAN CULTURE scale	0,639	-25,572	-	0,000
Item 2a – ADHOCRACY CULTURE scale	0,691	-19,757	-	0,000
Item 2b - ADHOCRACY CULTURE scale	0,663	-19,757	-	0,000
Item 2c - ADHOCRACY CULTURE scale	0,567	-22,384	-	0,000
Item 2d - ADHOCRACY CULTURE scale	0,717	-26,000	-	0,000
Item 2e - ADHOCRACY CULTURE scale	0,702	-23,277	-	0,000
Item 2f - ADHOCRACY CULTURE scale	0,638	-20,553	-	0,000
Item 3a – MARKET CULTURE scale	0,432	-24,268	-	0,000
Item 3b - MARKET CULTURE scale	0,485	-28,184	-	0,000
Item 3c - MARKET CULTURE scale	0,612	-28,120	-	0,000
Item 3d - MARKET CULTURE scale	0,622	-23,832	-	0,000
Item 3e - MARKET CULTURE scale	0,639	-26,792	-	0,000
Item 3f - MARKET CULTURE scale	0,486	-24,910	-	0,000
Item 4a – HIERARCHY CULTURE scale	0,440	-24,296	-	0,000
Item 4b - HIERARCHY CULTURE scale	0,210	-22,267	-	0,000
Item 4c - HIERARCHY CULTURE scale	0,611	-26,035	-	0,000
Item 4d - HIERARCHY CULTURE scale	0,644	-23,257	-	0,000
Item 4e - HIERARCHY CULTURE scale	0,665	-23,543	-	0,000
Item 4f - HIERARCHY CULTURE scale	0,470	-24,082	-	0,000

Source: self-reported data using Statistica program (version 12).

The results produced by the first approach are included in the column "item- scale score correlation." All the indicators, with the exception of the already mentioned second item of the hierarchy culture scale, are at a satisfactory level. The fall in discriminatory power for item 4b and

the fall in its correlation with the overall score of the scale is quite visible, but it is still above the allowable threshold level at 0,2 (Gąsiorowska A., Bajcar B., 2006, pp. 43-44). The analysis of p-value for t-Student test in relation to the extreme quartiles variances was preceded by the verification of the equality of variances conducted by the following tests: t, Leven and Brown-Forsythe test. The second approach – the analysis of variances of extreme quartiles was presented in the columns "t" and "t-section" (provided for the scores in which the earlier tests were to produce the equality of variances) and "p." These results suggest rather clearly that all the items (including, too, the second item of the hierarchy culture scale) have adequate discriminatory power. Taking into account all the results one may conclude that the OCAI items have appropriate psychometric parameters, adequate discriminatory power and there is no need to eliminate any of the questionnaire items.

7. Standardization of the OCAI questionnaire

In validation studies, with the analysis of validity, reliability and discriminatory power obtaining satisfactory psychometric parameters, the final step is to estimate the possibility of generating adequate standards for the questionnaire in question which, on the one hand, allow the level of scores to be precisely determined against the population examined and, on the other hand, to ensure the comparability of scores with those elicited using other tools with a similar system of norms. The possibility of devising norms is determined, however, by the similarity of the distribution of scores for individual scales in relation to the normal distribution – in the case of convergence, there is a basis for developing standardized norms (e.g. ten, sten or stanine norms), while in the case of asymmetry and a significant lack of similarity, one can device percentile norms (see and cf. Wudarzewski G., 2014). In questionnaire validation tests, a solution that is frequently employed for measuring this convergence is the K-S test (Kolmogorov's-Smirnov's test). In the procedure of devising norms, the author of this paper considerably increased the size of the sample up to N=933, using the results of studies conducted by other people and the level of the OCAI scales they estimated for which the norms were to be generated. The characteristics of the standardization sample were already described in Table 3. The detailed results of this study are included in Table 10 below.

Table 10. The results of the comparative analysis of convergence of the OCAI scale scores with the specificity of normal distribution

OCAI scales	Value D K-S	K-S value p	Skeweness	Kurtosis	Mean	Stand deviat ion.	Varianc.
CLAN CULTURE	0,076	0,000	0,358	0,541	24,380	8,774	76,990
ADHOCRACY CULTURE	0,062	0,001	0,308	0,780	21,209	7,528	56,678
MARKET CULTURE	0,066	0,000	0,265	0,002	27,471	8,919	79,551
HIERARCHY CULTURE	0,044	0,045	-0,102	0,417	26,945	8,449	71,397

Source: self-reported data using Statistica program (version 12).

On the one hand, the results elicited using the K-S test do not confirm convergence of the distribution of scores for individual scales with the normal distribution, but on the other hand, the resutls show that these distributions do not deviate much from the specificity of the normal distribution. A valid argument in such cases is also the visual evaluation of relatively symmetrical plots and their convergences with the bell shaped curve that is characteristic for the normal distribution. The researchers' opinions are divided on this issue. Micceri highlights the fact that a nearly ideal normal distribution is hardly ever observed in nature and in examining parametric tests many researchers misinterpret and considerably overrate it (Micceri T., 1989, pp.156-166). Under similar circumstances and with similar K-S test parameters, Witkowski and Ilski, as well as Drążkowski and Cierpiałkowska (Drążkowski and Cierpiałowska, 2013, pp. 29–41) assumed the similarity to the normal distribution. The author of this paper discussed this problem with some scholars in the field of psychometry, statistics and quantitative methods who suggested that one of the most crucial criteria in the similar situations was the relative symmetry of the plots of the distribuiton results, and by maintaing the symmetry there was no risk that the results would be significantly distorted.[4] In his extensive publication on key statisitcal issues, Field talks about the so called central limit theorem, according to which it is believed that the majority of distrubutions of various phenomena is simialr to normal distribution if the sample has at least 30 observations (Field, 2009, pp. 20-21). Another researcher Bulmer refers to a rule of thumb which says that if

[4] Selected researchers-consultants studying the essence of distributions were the following persons: Kleka Paweł at Psychology Faculty of Adam Mickiewicz University of Poznań, Forlicz Maria at the Faculty of Acountancy, Controlling, IT and Quantitative Methods Wrocaw University of Economics, Paluchowski Władysław at the Institute of Psychology, Department of General Psychology and Psychodiagnostics at Adam Mickiewicz University of Poznań, Paweł Iwankowski, statistical research and analysis manager at Operon company.

absolute values of skeweness and kurtosis do not exceed 1, then the distribution of scores can be considered to be slightly asymmetrical, and as such as not deviating significantly from the Gaussian curve, that is, a perfect normal distribution (Bulmer, 1979). George and Mallery, on the other hand, increase the suggested value to 2 (George, Mallery, 2010). Considering all the arguments, the scores obtained from Table 3 and the visual specificity of the distribution of scores for the different scales depicted in Figures 2,3,4, and 5, a compromise was accepted in that it was decided to devise two kinds of standards: percentile (which assume that scale distribuitons are not similar to normal distributions) and stanard ten (which assume that scale distributions are relatively similar to normal distributions), thus allowing a potential user of the validated OCAI version to choose as he sees fit and according to the particularities of a specific situation.

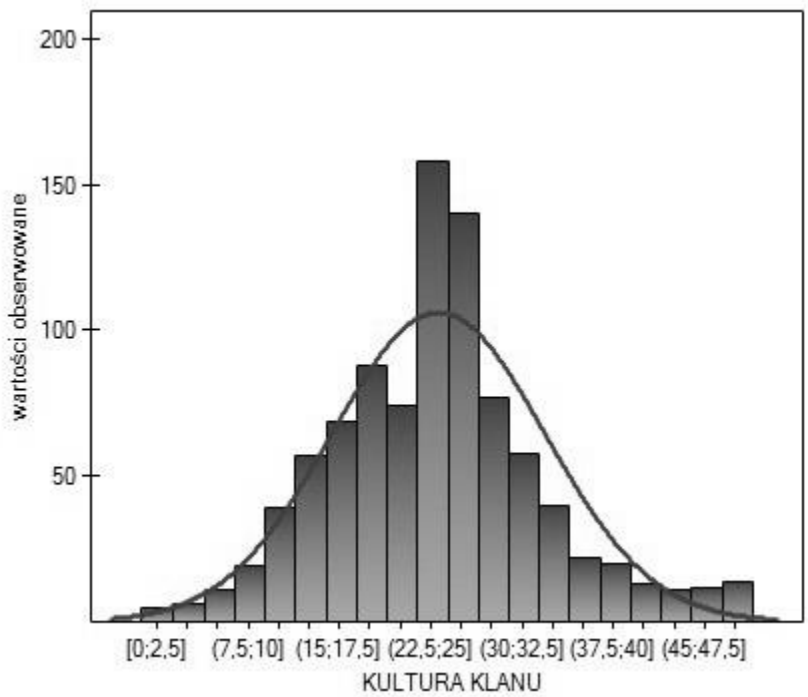

Figure 2. The score distribution graph for the clan culture scale of the standardization sample of N=933

Source: self-reported data using PO Stat, version 1.6.2 application.

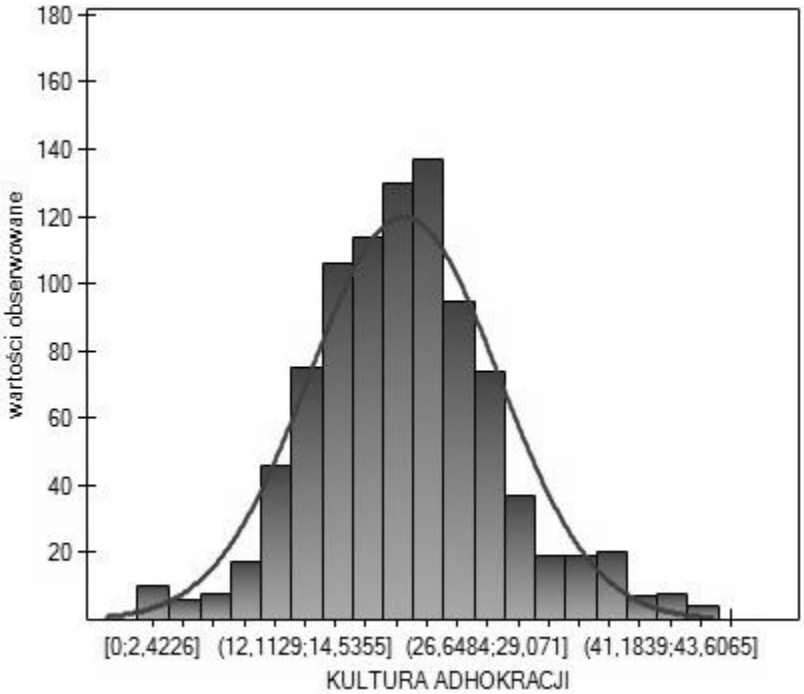

Figure 3. The score distribution graph for the adhocracy culture scale of the standardization sample of N=933

Source: self-reported data using PO Stat, version 1.6.2 application.

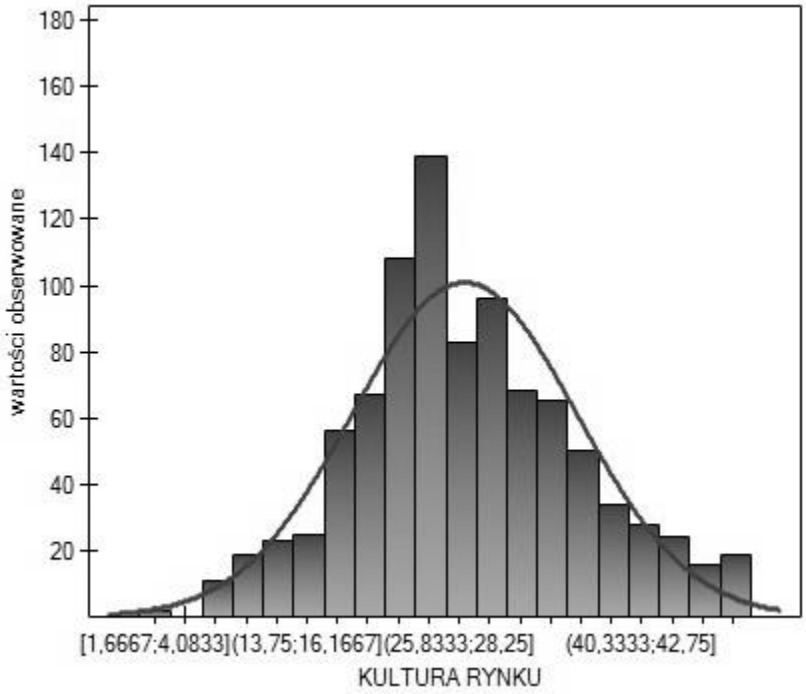

Figure 4. The score distribution graph for the market culture scale of the standardization sample of N=933

Source: self-reported data using PO Stat, version 1.6.2 application.

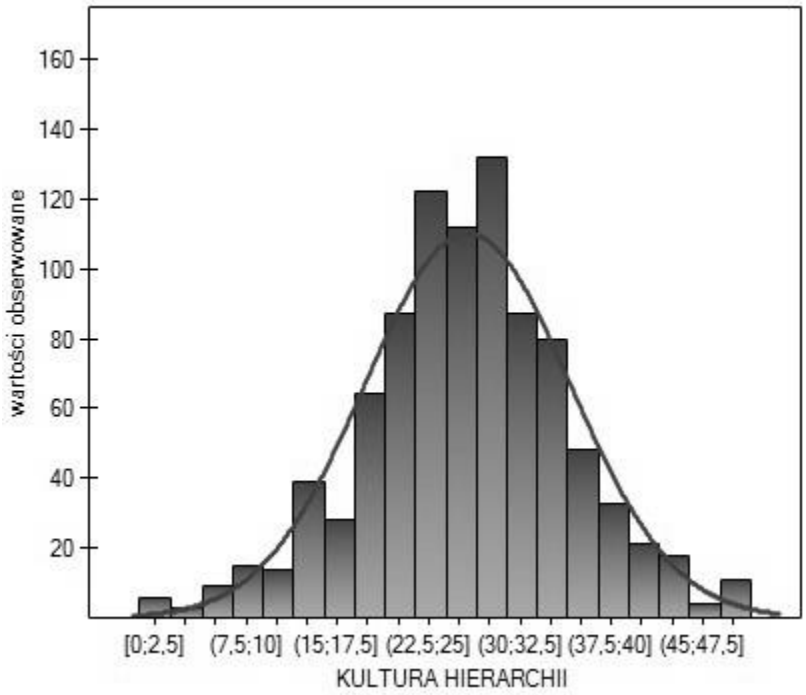

Figure 5. The score distribution graph for the hierarchy culture scale of the standardization sample of N=933

Source: self-reported data using PO Stat, version 1.6.2 application.

8. Conclusions

The results of the preliminary validation studies of the OCAI questionnaire in Polish conditions have largely confirmed the theoretical premises of the Competing Values Framework showing adequate psychometric qualities of the instrument that was analyzed in terms of its validity, reliability and discriminatory power. The score distribution tests for different OCAI scales of organizational cultures found that they did not differ significantly from the qualities of the normal distribution. What is left open, therefore, is the possibility of applying percentile or ten (standardized) norms devised for the validated OCAI tool. The author of this paper is, however, aware of the preliminary nature of this work and of the need to continue and expand the research on the tool discussed applying larger samples which could fulfill to a greater extent the requirements in terms of sample representativeness.

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ANNEX 1. Polish version of the OCAI questionnaire (source: Cameron K., Quinn R., 2015, p. 40)

In the questionnaire, there are four answers to each question; 100 points should be divided among those answers depending on how well a given answer reflects the situation of the organization in question. Most points should be given to the answer which you believe is the closest to the situation existing in your organization, or in the case of preferred situation, the answer which defines most accurately the need to change the organization for better and more productive. The remaining points divide among the other answers according to your own preferences, but keep in mind that the total for each question has to be 100. You have 100 points to divide for the now situation and 100 points for the preferred situation in each of the six parts of the questionnaire. At the end, write down the scores in the last table in row A (now) and P (preferred), add up and average the scores for each type of organizational culture.

assessment of the now situation – specifying the type of organizational culture that is currently in place

assessment of the preferred situation – the type of organizational culture which in the employees' (respondents') view should be implemented for the firm to be able to face future challenges and demands of the environment.

Part 1. **What are the dominant characteristics of the organization?**		Now	Preferred
A.	The organization is very a personal place. It is like an extended family. People seem to share a lot of themselves.		
B.	The organization is a very dynamic and entrepreneurial place. People are willing to stick their necks out and take risks		
C.	The organization is very result-oriented. A major concern is getting the job done. People are very competitive and achievement oriented.		
D.	The organization is very controlled and structured place. Formal procedures generally govern what people do.		
	Total	100	100

Part 2. **Organizational Leadership**		Now	Preferred
A.	The leadership in the organization is generally considered to exemplify mentoring, facilitating or nurturing.		
B.	The leadership in the organization is generally considered to exemplify entrepreneurship, innovation or risk taking.		
C.	The leadership in the organization is generally considered to exemplify a no-nonsense, aggressive, results-oriented focus.		
D.	The leadership in the organization is generally considered to exemplify coordinating, organizing or smooth-running efficiency.		
	Total	100	100

Part 3. **Management of Employees**		Now	Preferred
A.	The management style in the organization is characterized by teamwork, consensus and participation.		
B.	The management style in the organization is characterized by individual risk taking, innovation, freedom and uniqueness.		
C.	The management style in the organization is characterized by hard-driving competitiveness, high demands, and achievement.		

D.	The management style in the organization is characterized by security of employment, conformity, predictability, and stability in relationships.		
	Total	100	100

Part 4. **Organization Glue**		Now	Preferred
A.	The glue that holds the organization together is loyalty, mutual trust. Commitment to this organization runs high.		
B.	The glue that holds the organization together is commitment to innovation and development. There is an emphasis on being on the cutting edge.		
C.	The glue that holds the organization together is the emphasis on achievement and goal accomplishment.		
D.	The glue that holds the organization together is formal rules and policies. Maintaining a smooth-running organization is important.		
	Total	100	100

Part 5. **Strategic Emphasis**		Now	Preferred
A.	The organization emphasizes human development. High trust, openness, and participation persist.		
B.	The organization emphasizes acquiring new resources and creating new challenges. Trying new things and prospecting for opportunities are valued.		
C.	The organization emphasizes competitive actions and achievement. Hitting stretch targets and winning in the marketplace are dominant.		
D.	The organization emphasizes permanence and stability. Efficiency, control and smooth operations are important		
	Total	100	100

Part 6. **Criteria of Success**		Now	Preferred
A.	The organization defines success on the basis of the development of human resources, teamwork, employee commitment, and concern for people.		
B.	The organization defines success on the basis of having the most unique or newest products. It is a product leader and innovator.		
C.	The organization defines success on the basis of winning in the marketplace and outpacing the competition. Competitive market leadership is key .		
D.	The organization defines success on the basis of efficiency. Dependable delivery, smooth scheduling, and low-cost production are critical.		
	Total	100	100

The score table

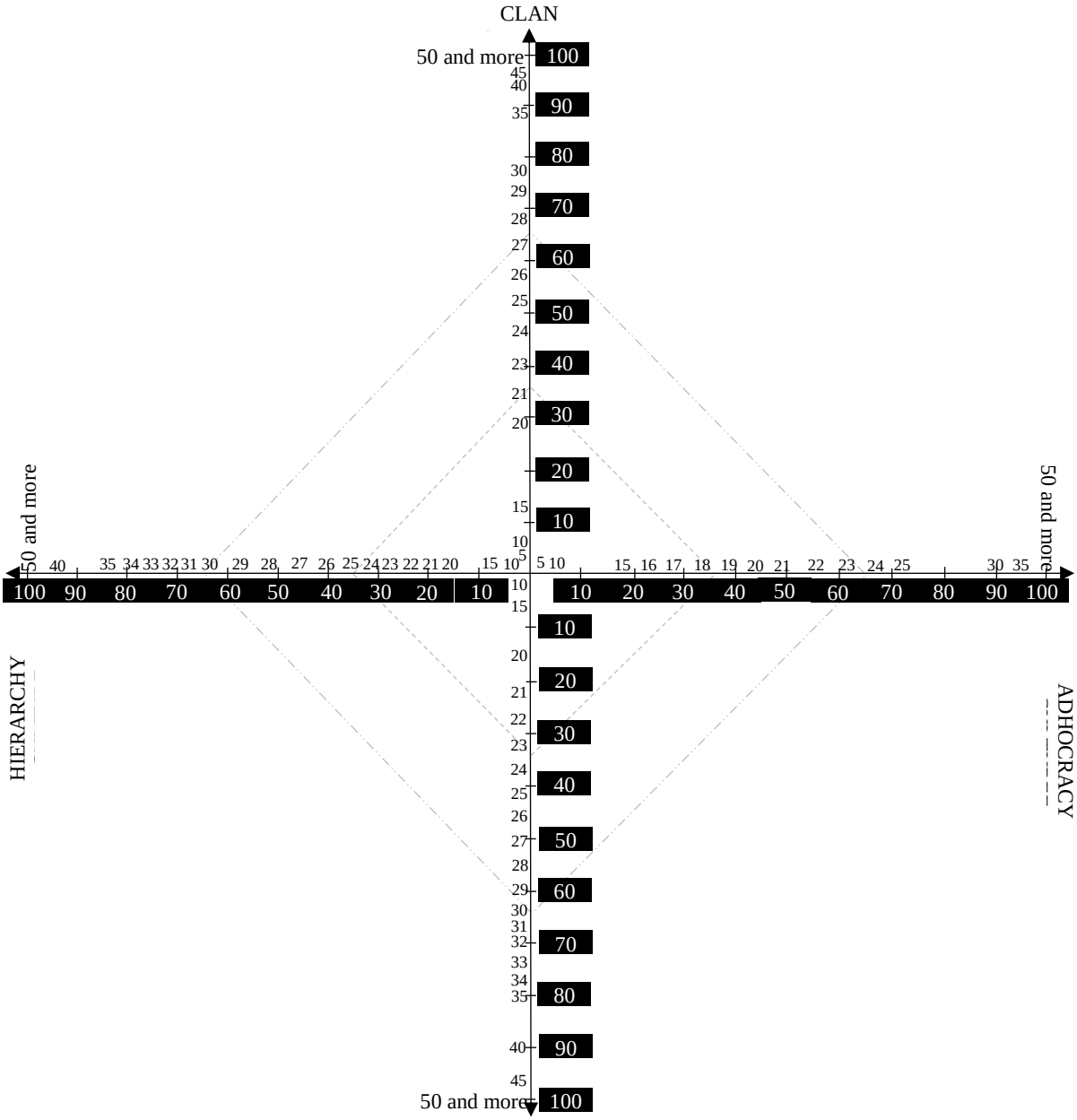
OCAI SCALE	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	**Average score**
A: Answers A - Clan culture							
A: Answers B – Adhocracy culture							
A: Answers C – Market culture							
A: Answers D – Hierarchy culture							
P: Answers A - Clan culture							

P: Answers B - Adhocracy culture							
P: Answers C - Market culture							
P: Answers D - Hierarchy culture							

ANNEX 2. Matrix of the percentile grid for the OCAI scales

INSTRUCTION

Fill in the OCAI questionnaire, and then add up and average the scores for the individual types of the organizational culture according to the procedure of the instrument. Each of the scales below has a place printed in black font where you should mark the point depending on the level of the averaged score you obtained – it is a raw score. If the scale does not have your exact score, mark the point which is as close as possible to your score. Follow the same pattern when doing all the scales (type of organizational culture). Then, connect all the points that you marked and draw the OCAI profile of the levels of the organizational cultures.



MARKET CULTURE

Next to the raw scores, on the other side of the axis there are percentile norms from 0 to 100 in black boxes with white font,. Every raw score you can convert following the percentile level located at the same level as the raw score. Now you can express the score in percentiles for each scale. The percentile level tells you what percentage of a given population obtained the same score as yours and, adequately, what percentage of the population assessed the individual levels of the OCAI organizational cultures at a higher or lower level. Very low scores fall within the range of 0-15 percentiles, the range between 16-35 is considered average, 36-65 is high with 91-100 percentiles denoting a very high level.

ANNEX 3. Table with standard ten for the OCAI

INSTRUCTION

Fill in the OCAI questionnaire and then sum up and average the scores for the individual types of the organizational culture in accordance with the procedure of the tool – this is a raw score. Round the averaged raw scores to one decimal place, and next add or subtract 85% or 95% error values.

The OCAI scales	SEM	85%	95%
CLAN CULTURE	3,510	5,1	6,9
ADHOCRACY CULTURE	2,772	4	5,4
MARKET CULTURE	4,058	5,8	8
HIERARCHY CULTURE	4,131	5,9	8,1

(e.g. for the likelihood of score at 85% and raw score in the adhocracy scale at 35,1, first write down the direct score and then in brackets the score reduced by 4 and increased by 4: 35,1 (31,1; 39,1). Then convert the score into ten norms (converted score)

Standard ten scale	Raw score interval for CC scale	Raw score interval for AC scale	Raw score interval for MC scale	Raw score interval for HC scale	Standard ten scale	Raw score interval for CC scale	Raw score interval for AC scale	Raw score interval for MC scale	Raw score interval for HC scale
20			0,3 - 1,1	1,2 - 2	**60**	32,8 - 33,5	28,4 - 29,1	36 - 36,8	35 - 35,8
21			1,2 – 2	2,1 -2,9	**61**	33,6 - 34,4	29,2 - 29,8	36,9 - 37,7	35,9 - 36,6
22	0 - 0,2	0 - 0,5	1,2 - 2,9	2,9 do 3,7	**62**	34,5 - 35,3	29,9 - 30,6	37,8 - 38,6	36,7 - 37,5
23	0,3 - 1,1	0,6 - 1,2	3 - 3,8	3,8 do 4,5	**63**	35,4 - 36,2	30,7 - 31,3	38,7 - 39,5	37,6 - 38,3
24	1,2 – 2	1,3 - 2	3,9 - 4,7	4,6 do 5,3	**64**	36,3 - 37,1	31,4 - 32,1	39,6 - 40,4	38,4 - 39,1
25	2,1 - 2,8	2,1 - 2,7	4,8 - 5,6	5,4 do 6,2	**65**	37,2 –37,9	32,2 - 32,8	40,5 - 41,2	39,2 - 40
26	2,9 - 3,7	2,8 - 3,5	5,7 - 6,5	6,3 do 7	**66**	38 - 38,8	32,9 - 33,6	41,3 - 42,1	40,1 - 40,8
27	3,8 - 4,6	3,6 - 4,2	6,6 - 7,4	7,1 do 7,9	**67**	38,9 - 39,7	33,7 - 34,3	42,2 - 43	40,9 - 41,7
28	4,7 - 5,5	4,3 - 5	7,5 - 8,2	8 do 8,7	**68**	39,8 - 40,6	34,4 - 35,1	43,1 - 43,9	41,8 - 42,5
29	5,6 - 6,3	5,1 - 5,7	8,3 - 9,1	8,8 do 9,6	**69**	40,7 - 41,4	35,2 - 35,8	44 - 44,8	42,6 - 43,4
30	6,4 - 7,2	5,8 - 6,5	9,2 - 10	9,8 - 10,4	**70**	41,5 - 42,3	35,9 - 36,6	44,9 - 45,7	43,5 - 44,2
31	7,3 - 8,1	6,6 - 7,2	10,1 - 10,9	10,5 - 11,3	**71**	42,4 - 43,2	36,7 - 37,3	45,8 - 46,6	44,3 - 45,1
32	8,2 - 9,0	7,3 - 8	11 - 11,8	11,4 - 12,1	**72**	43,3 - 44,1	37,4 - 38,1	46,7 - 47,5	45,2 - 45,9
33	9,1 – 9,9	8,1 - 8,7	11,9 - 12,7	12,2 - 13	**73**	44,2 – 45	38,2 - 38,9	47,6 - 48,4	46 - 46,8
34	10 - 10,7	8,8 - 9,5	12,8 - 13,6	13,1 - 13,8	**74**	45,1 - 45,8	39 - 39,6	48,5 - 49,3	46,9 - 47,6
35	10,8 - 11,6	9,6 - 10,2	13,7 - 14,5	13,9 - 14,6	**75**	45,9 - 46,7	39,7 - 40,4	49,4 - 50,2	47,7 - 48,4
36	11,7 - 12,5	10,3 - 11	14,6 - 15,4	14,7 - 15,5	**76**	46,8 - 47,6	40,5 - 41,1	50,3 - 51,1	48,5 - 49,3
37	12,6 - 13,4	11,1 - 11,8	15,5 - 16,3	15,6 - 16,3	**77**	47,7 - 48,5	41,2 - 41,9	51,2 - 51,9	49,4 - 50,1
38	13,5 - 14,2	11,9 - 12,5	16,4 - 17,2	16,4 - 17,2	**78**	48,6 - 49,3	42 - 42,6	52 - 52,8	50,2 - 51
39	14,3 - 15,1	12,6 - 13,3	17,3 - 18,1	17,3 - 18	**79**	49,4 - 50,2	42,7 - 43,4	52,9 - 53,7	51,1 - 51,8
40	15,2 - 16	13,4 - 14	18,2 - 18,9	18,1 - 18,9	**80**	50,3 - 51,1	43,5 - 44,1	53,8 - 54,6	51,9 - 52,7
41	16,1 –16,9	14,1 - 14,8	19 - 19,8	19 - 19,7	**81**	51,2 – 52	44,2 - 44,9	54,7 - 55,5	52,8 - 53,5
42	17 - 17,8	14,9 - 15,5	19,9 - 20,7	19,8 - 20,6	**82**	52,1 – 52,8	45 - 45,6	55,6 - 56,4	53,6 - 54,4
43	17,9 - 18,6	15,6 - 16,3	20,8 - 21,6	20,7 - 21,4	**83**	52,9 – 53,7	45,7 - 46,4	56,5 - 57,3	54,5 - 55,2
44	18,7 - 19,5	16,4 - 17	21,7 - 22,5	21,5 - 22,2	**84**	53,8 – 54,6	46,5 - 47,1	57,4 - 58,2	55,3 - 56
45	19,6 - 20,4	17,1 - 17,8	22,6 - 23,4	22,3 - 23,1	**85**	54,7 – 55,5	47,2 - 47,9	58,3 - 59,1	56,1 - 56,9
46	20,5 - 21,3	17,9 - 18,5	23,5 - 24,3	23,2 - 23,9	**86**	55,6 – 56,4	48 - 48,6	59,2 - 60	57 - 57,7

47	21,4 - 22,1	18,6 - 19,3	24,4 - 25,2	24 - 24,8	**87**	56,5 – 57,2	48,7 - 49,4	60,1 - 60,9	57,8 - 58,6
48	22,2 – 23	19,4 - 20	25,3 - 26,1	24,9 - 25,6	**88**	57,3 – 58,1	49,5 - 50,1	61 - 61,8	58,7 - 59,4
49	23,1 – 23,9	20,1 - 20,8	26,2 - 27	25,7 - 26,5	**89**	58,2 – 59	50,2 - 50,9	61,9 - 62,7	59,5 - 60,3
50	24 - 24,8	20,9 - 21,5	27,1 - 27,9	26,6 - 27,3	**90**	59,1 – 59,9	51 - 51,6	62,8 - 63,5	60,4 - 61,1
51	24,9 - 25,6	21,6 - 22,3	28 - 28,8	27,4 - 28,3	**91**	60 – 60,7	51,7 - 52,4	63,6 - 64,4	61,2 - 62
52	25,7 - 26,5	22,4 - 23	28,9 - 29,7	28,4 29	**92**	60,8 – 61,6	52,5 - 53,2	64,5 - 65,3	62,1 - 62,8
53	26,6 - 27,4	23,1 - 23,8	29,8 - 30,5	29,1 - 29,9	**93**	61,7 – 62,5	53,3 - 53,9	65,4 - 66,2	62,9 - 63,7
54	27,5 - 28,3	23,9 - 24,5	30,6 - 31,4	30 - 30,7	**94**	62,6 – 63,4	54 - 54,7	66,3 - 67,1	63,8 - 64,5
55	28,4 - 29,2	24,6 - 25,3	31,5 - 32,3	30,8 - 31,5	**95**	63,5 – 64,3	54,8 - 55,4	67,2 - 68	64,6 - 65,3
56	29,3 – 30	25,4 - 26,1	32,4 - 33,2	31,6 - 32,4	**96**	64,4 – 65,1	55,5 - 56,2	68,1 - 68,9	65,4 - 66,2
57	30,1 – 30,9	26,2 - 26,8	33,3 - 34,1	32,5 - 33,2	**97**	65,2 – 66	56,3 - 56,9	69 - 69,8	66,3 - 67
58	31 - 31,8	26,9 - 27,6	34,2 - 35	33,3 - 34,1	**98**	66,1 – 66,9	57 - 57,7	69,9 - 70,7	67,1 - 67,9
59	31,9 - 32,7	27,7 - 28,3	35,1 - 35,9	34,2 - 34,9	**99**	67 - 67,8	57,8 - 58,4	70,8 - 71,6	68 - 68,7
					100	67,9 – 100	58,5 - 100	71,7 - 100	66,8 - 100

STANDARD TEN OF SCALES: v. low (20-34), low (35-44), average (45-55), high (56-65), v. high (over 66)