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Validation study of a model for the assessment of potential in Italian Young Professionals working in medium-sized to large companies in different business sectors

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Abstract The paper presents the results of a survey carried out on the potential profiles of 1,068 Italian Young Professionals coming out from Assessment Center and Development Center activities. A review carried out on a database of potential profiles made available by GSO, which has acknowledged the potential assessments conducted by 35 medium to large sized companies of 8 different business sectors (Banking, Publishing, Pharmaceutical, Large-scale distribution, Transports, Fashion and Luxury, Telecommunications, Energy) over ten years, showed that the potential assessment of Young Professionals was carried out by means of observation grids including from 15 to 20 different skills, reaching a total number of 48 skills evaluated in all the companies examined. The aim of this research is to achieve an assessment model that includes the smallest possible number of highly predictive potential skills, avoiding dispersions and redundancies in the assessment and maximizing the opportunities for the companies to make correct managerial choices when using potential data. The research has applied a series of statistical models (correlation, factor analysis and regression) in order to reduce the number of abilities and identify those that predict the overall performance. The results show that the number of "necessary" skills is below 10. Two assessment models have been obtained, one defined as *Narrow* (eight necessary skills) and another defined as *Broad* (14 skills, the necessary ones plus others considered as "secondary" but relevant).

Keywords Potential · Potential assessment · Assessment center · Validation study

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1 Introduction: the assessment of potential in Young Professionals

The term "potential" refers to the contribution that workers could give in the future when filling different positions from their current one, which may require more responsibility. Referring to the assessment model of the *3Ps* (because it provides the assessment of the *Position* undertaken by workers, their implemented *Performance* and their *Potential* to be expressed), workers occupy an organizational position and express a performance in the role they currently cover. However, their potential is unknown because this, due to its very nature, refers to the contribution that could be given in future and can hardly be surveyed in the current role (Del Pianto 2008; Fertonani 2003).

The expression "assessment of potential" intends carrying out activities, structured and designed for the purpose, aimed at reaching a judgement, both qualitative and quantitative, which is pertinent to the potential not expressed by those workers on which companies might want to invest in an organizational development perspective (OD, *Organizational Development*, Rao 2010). It consists in detecting the opportunities for future development towards other positions (Marino and Rolandi 2006), providing information for the horizontal and vertical mobility (career counselling and development).

The methods that are considered more valid and reliable when assessing potential are those of the Assessment Center and Development Center (Gaugler et al. 1987; Klimoski and Brickner 1987). They place people in simulated situations apt to extract observable behaviours ascribable to the skills object of the assessment (Migliori and Rolandi 2000; Thornton III and Rupp 2006). The task of the assessors is not easy (Skolits et al. 2009), since it consists in delivering a judgement on every single feature being assessed for potential by going through an observation of the behaviour. For this, in the context of the 26th Congress on the Assessment Center held in San Francisco, the *Guidelines and Ethical Considerations for Assessment Center Operations* (2009) have been prepared, according to which an "Assessment Center consists in a standardized assessment of behaviour based on multiple inputs. Different techniques and several trained observers are used. The assessment of behaviour is greatly based on simulations that have been developed for the purpose. These evaluations are prepared during a meeting of the assessors or a process of statistical integration".

"Young Professional" describes a person who, usually with a university degree, has worked for the company for at least three/five years, carrying out tasks that require the possession of professional skills and the gradual acquisition of a high *know-how*. This may involve engineers operating in high-technology sectors (for example in design or quality assurance roles), people part of the staff (in legal, finance or human resources offices), or commercial roles which require consultancy on possible solutions/products or services (Keenan and Newton 1985). The various Young Professionals have in common the fact that they have not taken on direct management responsibilities yet (for people, budgets, and, in general, resources), but have expressed a good performance in their current role (and in the previous ones). The assessment of potential is often made in the perspective of a managerial growth: for example, to assess the possibility of a moving on to middle management roles.

If for potential we intend the pool of *personal features necessary to be successful in intended roles*, what is interesting is not much the professional and behavioural skills required by the current role assessed in Young Professionals but the personal qualities they imply, that is the skills that enable the person to learn the more complex behavioural and professional competences necessary for future roles (Paulsson et al. 2005).

The number of skills observed in a potential assessment process depends on the used observation/assessment grid and it varies according to the organization. With respect to the number of skills contained by each grid it is interesting to wonder whether all those included

are equally "necessary", as they are truly predictive for the potential, or not. In fact, determining the predictive effectiveness of the skills to assess maximizes the possibility of making correct managerial choices in the use of potential data (Highhouse 2002). In addition, focusing on key skills, those that really predict the resource potentials, allows optimizing the assessment process, elevating, at the same time, the reliability and the quality of the management decisions to take on (i.e. whom to choose, to promote, to keep as a leader).

2 Research objectives and hypotheses

Given the considerations above, the objectives of the research presented here are two:

1. Collect empirical evidence on how many and which skills, among the various ones used for the assessment of potential in Italian Young Professionals, are actually related to the potential and thus can predict it;
2. Reach a model for the assessment of potential in Italian Young Professionals that includes the minimum possible number of truly predictive potential skills.

The hypothesis is that not every skill, observed in each activity of potential assessment, can predict the potential in the same way; on the contrary, there might be differences in the probability of each individual skill in predicting the potential, to the point that some skills could be considered as "necessary", others as "secondary" and others as such as "useless".

3 Method

3.1 Participants

1,068 Italian Young Professionals took part in the survey. They had undergone an assessment of potential by GSO (Consultancy Firm for the Enterprise Development) throughout a decade. They came from 35 medium to large sized companies belonging to the business sectors of Banking, Publishing, Pharmaceutical, Large-scale Distribution, Transport, Fashion and Luxury, Telecommunications and Energy.

3.2 Tools and procedure

The operations for the potential assessment of the participants were conducted by means of observing the behaviour in controlled (validated and standardized) situations (through group and individual tests). Each participant was assessed on a variable number of 15–20 skills in the context of assessments of potential using Assessment Center and Development Center. Each skill was evaluated on a scale of 1 (= very low score) to 5 (= very high score), half points included.

The initial database included 48 skills that subsequently merged into 26 on the basis of two criteria, one qualitative and the other quantitative:

1. *Qualitative criterion*: analysis of the labels and of the content of each skill related to the declaration, to trace the behaviours observed for each of the different skills and identify their overlapping areas;
2. *Quantitative criterion*: correlation and factor analysis for the identification of skills that, from a statistical point of view, share a variance percentage above 49% ($r > 0.70$, $r^2 > 0.49$) and thus show that they refer, essentially, to the same feature.

Table 1 Descriptive statistics (Min = minimum; Max = maximum; SD = standard deviation; Skew. = skewness; Kurt. = Kurtosis) for the 26 skills

	Min	Max	Mean	SD	Skew.	Kurt.
Analysis and identification of problems	1.0	4.5	3.2	0.91	−0.15	0.25
Attention to economics and efficiency	1.5	4.5	3.1	0.72	0.16	0.95
Care of performance quality	2.0	5.0	3.0	0.67	0.81	0.26
Collaborator's development	1.0	4.5	3.0	0.88	−0.31	0.13
Communication and listening	1.0	5.0	2.9	0.94	0.04	0.43
Coordination, process management, task management	2.0	5.0	3.1	0.91	0.05	0.16
Customer orientation	2.0	5.0	3.0	0.77	0.53	0.15
Decision making and risk taking	1.5	4.5	3.0	0.96	0.17	−0.06
Flexibility and prompt adaptation	1.0	5.0	2.9	0.98	−0.14	0.15
Focusing on result and energy	2.0	5.0	3.2	1.0	0.05	0.32
Guidance and management of people	1.0	5.0	2.9	0.70	−0.08	0.08
Initiative and proactivity	1.0	5.0	3.0	1.0	−0.03	0.40
Innovation and change	0.0	5.0	2.8	0.91	−0.56	0.48
Integration and networking	1.5	4.5	3.1	0.99	−0.11	0.22
Integrity and transparency	3.0	4.0	3.0	0.52	0.25	0.97
Monitoring and control	2.0	5.0	3.0	0.78	0.37	0.72
Negotiation	0.0	4.5	2.8	0.93	−0.64	0.58
Organisational sensitivity	0.0	5.0	2.9	0.77	−0.69	0.98
Persuasion and personal authoritativeness	1.0	4.5	2.7	1,1	0.30	−0.05
Self-development and ambition	2.0	5.0	3.2	0.85	0.52	0.16
Self-esteem	2.0	4.0	3.3	0.63	−0.22	0.64
Social intelligence and interpersonal sensitiveness	2.0	5.0	3.0	0.82	0.86	0.68
Strategic vision	1.5	4.5	2.9	0.73	−0.12	0.27
Stress management and positive thinking	1.0	5.0	2.9	0.79	−0.52	0.96
Synthesis and pragmatism	0.0	5.0	3.2	0.90	−0.02	0.89
Systemic thinking	0.0	5.0	2.9	0.97	−0.38	0.76

The labels of the 26 standardized skills are visible in Table 1 (in alphabetical order), which also shows the descriptive statistics for each skill obtained from the assessments implemented with the sample of 1,068 Italian Young Professionals here considered.

As mentioned, each Young Professional included in this study got a 1 to 5 (half points included) evaluation for each of the 26 skills. Missing data for each skill have been replaced with the mean of the variable in order to avoid significant strain on both the indices of central tendency and the indices of dispersion for each skill, that is to say on the distributions of the variables.

In addition to the 26 skills, the database contains the *total potential score* (the sum of the scores obtained by each person assessed for skills).

Considering the sample size ($N = 1{,}068$), the measurement level of variables (compatible with the interval scale) and the distribution properties (approximating the normal curve according to skewness and kurtosis indices, included between −1 and +1; see Table 1) (Barbaranelli 2007; Sartori 2006, 2008), the procedure provides for the computation of the Pearson r correlation coefficients between each one of the 26 skills and the total poten-

tial score (this procedure is known as item-total correlation according to the Classical Test Theory) to pursue objective 1 (*collect empirical evidence on how many and which skills are correlated with the potential and thus can predict them*). The correlation coefficient was corrected so that the skill correlated with the total score did not weigh twice, once as a single variable and the other as part of the total score. In fact, without correction, the correlation coefficient would be overestimated. After this operation, also the coefficient of determination was calculated: it is equivalent to the square of the correlation coefficient (r^2), as a sharing measure of the variance between the two correlated variables (skill and potential).

With reference to objective 2 (*reach an assessment model of the potential that contemplates the minimum possible number of skills that really predict the potential*), a series of factor analyses and principal component analyses with varimax rotation were conducted (Pannocchia and Giannini 2007; Luccio and Paganucci 2007). Finally, a regression analysis was conducted between the skills included in the model and the total potential score, in order to test the validity of the model in terms of prediction and explanation.

4 Results

Table 2 shows the corrected correlation coefficients between each skill and the overall potential score (r), as well as the coefficient of determination (r^2). In Table 2, the skills are shown in descending order with respect to the calculated coefficients. As noticed, all the correlation coefficients are positive ($r > 0$) and above 0.40, *cut-off* beyond which the correlation coefficient becomes statistically significant in the case of psychosocial research (Ercolani and Perugini 1997).

However, it is not sufficient that the skills show a correlation coefficient that is statistically relevant or even high ($r > 0.60$) to be able to treat them as predictors of the potential in a hypothetical multiple regression model. It is indeed necessary that these skills will be not too correlated between one another (phenomenon indicated in statistics as *collinearity* of predictors), in order to avoid the risk of including skills in the model that share an excessive variance and therefore substantially measure the same thing.

For this reason, a series of factor analyses (common factors method) and principal components analyses were conducted on the total of 26 skills correlated with the potential. We report here, in Table 3, the solution that appeared as the most stable and easily interpretable (principal components analysis, eigenvalues > 1, exploration of the Cattel scree-plot, varimax rotation, saturation cut-off = 0.35). It extracts 9 principal components and explains in total the 65% of the total variance (index of sampling adequacy KMO = 0.85, Bartlett's sphericity test statistically significant for $p < 0.001$).

On the basis of the correlation and determination coefficients and the principal components analysis, two models for the assessment of potential have been extracted:

1. *Narrow Model*: provides for the assessment of eight skills deemed as "necessary" based on the results of the previous analyses (Table 4);
2. *Broad Model*: provides for the assessment of 14 skills, the eight "necessary" for the previous model plus other six considered "secondary" (Table 5).

Both models were subjected to multiple linear regression analysis to test the predictive power of each skill on the total potential score (beta and p-value parameters in Tables 3 and 4) and the goodness of fit of the model (r^2 correct).

Table 2 coefficients of correlation and determination between skills and potential

Skill	Pearson r with potential	Coefficient of determination (r^2)
Guidance and management	0.79	0.62
Systemic thinking	0.68	0.46
Persuasion and personal authoritativeness	0.67	0.45
Care of quality performance	0.66	0.44
Synthesis and pragmatism	0.66	0.44
Focusing on result and energy	0.65	0.42
Analysis and identification of problems	0.60	0.36
Communication and listening	0.60	0.36
Stress management and positive thinking	0.60	0.36
Strategic vision	0.60	0.36
Decision making and risk taking	0.59	0.35
Initiative and proactivity	0.59	0.35
Self-esteem	0.57	0.33
Flexibility and prompt adaptation	0.54	0.29
Negotiation	0.53	0.28
Monitoring and control	0.53	0.28
Self-development and ambition	0.52	0.26
Coordination, process management, task management	0.52	0.26
Organisational sensitivity	0.52	0.26
Integration and networking	0.51	0.26
Innovation and change	0.50	0.25
Collaborator's development	0.45	0.20
Attention to economics and efficiency	0.44	0.19
Integrity and transparency	0.44	0.19
Social intelligence and interpersonal sensitiveness	0.41	0.17
Customer orientation	0.41	0.17

5 Discussion and conclusions

The results show a positive ($r > 0$) and significant ($r > 0.40$) correlation between each skill assessed in the context of the assessment of potential and the total potential score. This indicates that all the 26 skills considered in this study really deal with the total potential score and each of them contributes, albeit differently, in the prevision (the determination coefficients vary between 0.17 and 0.62). Therefore none of the skills results as technically "unnecessary".

However, according to the hypothesis, not all the skills contemplated for the assessment of potential in the Italian Young Professionals included in this study are equally predictive of the total potential assessment score. In fact there are differences in the probability that each individual skill has to predict it. The factor analyses and the principal components analyses carried out on the 26 skills tend to extract nine dimensions, seven if we exclude those that, according to literature (Comrey and Lee 1992; Barbaranelli 2007), may be regarded as residual (in the case of the principal components analyses reported in Table 2, the last two

Table 3 principal components analysis regarding the 26 skills (eigenvalues > 1, varimax rotation, saturation cut-off = 0.35)

	Components								
	1	2	3	4	5	6	7	8	9
Focusing on result and energy	0.80								
Decision making and risk taking	0.79								
Persuasion and personal authoritativeness	0.68								
Synthesis and pragmatism	0.66								
Initiative and proactivity	0.66								
Social intelligence and interpersonal sensitiveness		0.85							
Flexibility and prompt adaptation		0.69							
Integration and networking		0.48							
Negotiation		0.38							
Organisational sensitivity			0.75						
Customer orientation			0.71						
Communication and listening			0.45						
Attention to economics and efficiency				0.72					
Guidance and management of people				0.66					
Collaborator's development				0.45					
Care of performance quality					0.81				
Self-development and ambition					0.68				
Monitoring and control						0.76			
Systemic thinking						0.60			
Analysis and identification of problems						0.51			
Coordination, process management, task management						0.49			
Self-esteem							0.81		
Stress management and positive thinking							0.53		
Innovation and change							0.40		
Strategic vision								0.92	
Integrity and transparency									0.98
Explained variance (%)	13	8	8	7	7	7	6	5	4

Table 4 *Narrow Model*, multiple linear regression analysis (r^2 correct = 0.64)

Skill	r with potential	Affiliation component	β	p
Persuasion and personal authoritativeness	0.67	1	0.26	0.001
Synthesis and pragmatism	0.66	1	0.11	0.001
Focusing on result and energy	0.65	1	0.26	0.001
Flexibility and prompt adaptation	0.54	2	0.16	0.001
Integration and networking	0.51	2	0.38	0.001
Communication and listening	0.60	3	0.19	0.001
Guidance and management of people	0.79	4	0.09	0.002
Systemic thinking	0.68	6	0.15	0.001

Table 5 *Broad Model*, multiple linear regression analysis (R^2 correct = 0.69)

Skill	r with potential	Affiliation component	β	p
Persuasion and personal authoritativeness	0.67	1	0.21	0.001
Synthesis and pragmatism	0.66	1	0.10	0.005
Strive towards result and energy	0.65	1	0.22	0.001
Initiative and proactivity	0.59	1	0.23	0.001
Decision making and risk taking	0.59	1	0.21	0.001
Flexibility and prompt adaptation	0.54	2	0.14	0.001
Social intelligence and interpersonal sensitiveness	0.41	2	0.09	0.011
Integration and networking	0.51	2	0.36	0.001
Communication and listening	0.60	3	0.18	0.001
Organisational sensitivity	0.52	3	0.04	0.079
Guidance and management of people	0.79	4	0.07	0.022
Care of performance quality	0.66	5	0.10	0.001
Systemic thinking	0.68	6	0.12	0.001
Self-esteem	0.57	7	0.12	0.001

components). This means that the 26 skills that were already the result of a previous merging can be grouped further. Besides, the number of these groupings is around seven units. This is why it was decided to reduce the initial pool of 26 skills to a smaller pool of skills that were highly correlated with the potential ("necessary" skills, *Narrow Model*, Table 4). And this is also the reason why the selected skills ("necessary" and "secondary") never belong to components above the seventh.

In the *Narrow Model* (eight skills):

1. the correlation coefficients vary from 0.51 to 0.79;
2. the determination coefficients vary from 0.26 to 0.62;
3. the components to which the skills belong vary from 1 to 6.

In the *Broad Model* (14 skills):

1. the correlation coefficients vary from 0.41 to 0.79;
2. the determination coefficients vary from 0.17 to 0.62;
3. the components to which the skills belong vary from 1 to 7.

It should be noted that, although the R^2 corrected improves from the *Narrow* model to the *Broad* model (this effect is due to the larger number of predictors), the prediction of the individual skills decreases, even if by a little (comparing the betas of the two tables for the 8 shared skills); and a skill present in the *Broad* model but not in the *Narrow* (Organizational Sensitivity) is not predictive ($p > 0.05$).

This is an indication of the fact that, in our opinion, the effort required to the observers to assess a greater number of skills does not give a result in terms of reliability of the prevision. Eight skills, strongly and highly correlated with the total potential score, work as much as, or even better, than fourteen skills that are not equally strongly and highly correlated with the total potential score.

This is operationally important where the determination of the predictive effectiveness of the skill to assess maximizes the possibility of making correct choices when using the

potential data. Besides, reducing the number of skills to be assessed streamlines and focuses the potential assessment operations: focusing on the key skills, that is to say those that really predict the resource potential, allows to optimize the assessment process, increasing, at the same time, the reliability and the quality of the management decisions to be made (i.e. whom to choose, to promote, to keep as a leader).

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