



## Analytical Uses of a Competency Measurement Model

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### ABSTRACT

Competency mapping is increasingly used in the field of HR development and empowerment. In this paper, some analytical uses of a model for the Competency Mapping and Measurement are presented. This approach allows information to be obtained about the level of appropriateness of the skills associated with the different processes. Furthermore, it is possible to analyse the morphology of the business processes, to assess the staff, to better use and distribute the resources over the processes, to promote the mobility of the people across the firm and to optimize training activity and HR management.

(\* *The views expressed here are the sole responsibility of the author and do not necessarily reflect those of the Banca d'Italia.*

**Keywords:** Competency model, Competency Mapping, HR Development.

### 1. Competency

In the literature, several definitions of competency are available [2][4]. In the HR-XML Consortium Competencies Schema [5] a competency is defined as “*a specific, identifiable, definable, and measurable knowledge, skill, ability and/or other deployment-related characteristic (e.g. attitude, behavior, physical ability) which a human resource may possess and which is necessary for, or material to, the performance of an activity within a specific business context*”.

Competencies are the building blocks of a competency model. According to Draganidis and Mentzas [3] “*a competency model is a list of competencies which are derived from observing satisfactory or exceptional employee performance for a specific occupation. The model can provide identification of the competencies employees need to develop in order to improve performance in their current job or to prepare for other jobs via promotion or transfer. The model can also be useful in a skill gap analysis, the comparison between available and needed competencies of individuals or organizations. An individual development plan could be developed in order to eliminate the gap*”.

Each competency in the model is defined by means of behavioral descriptors. These descriptors can be defined by determining the highest and lowest levels of proficiency. A simplified taxonomy derived from the literature available on this topic [6] groups competencies into three categories:

- a) *Knowledge*. It concerns everything that can be learned from educational/formative systems and training courses and everything which involves cognitive processes (i.e. perception, learning, communication, association and reasoning). It represents the theoretical understanding of something such as a new or updated method or procedure, etc...
- b) *Know-how*. It is related to personal experiences and working conditions. It is learned by doing, by practice, by experience. It is the practical knowledge consisting in “how to get something done”.
- c) *Behavior*. It is referred to individual characters, talents, human traits, or qualities that drive someone to act or react in a certain way under certain circumstances.<sup>1</sup>

Furthermore, an individual has several competencies impacting on organizational activities and patterns of organizational evolution and change [7]. An activity needs specific competencies to be executed and to optimize its performance. The built-up of the model should be made according to the following guidelines.

The behavioral competencies could be included according to the general definition provided by the literature. They don't depend on the nature of the business but are “embedded” in the resources. Several taxonomies of the behavioral competencies are available and could be adopted.

<sup>1</sup> Behavioral competencies describe what is required to be successful in an organization outside of a specific job. As such, they are specific to a person rather than to a job. For example, the Team Leader is a person who “*effectively manages and guides group efforts; tracks team progress, adequately anticipates roadblocks, and changes course as needed to achieve team goals; provides appropriate feedback concerning group and individual performance*”[8].



The knowledge competencies are related to the specific business environment. For example, the business processes of an ICT company require technical competencies like the networking theory or the programming languages. The choice of the knowledge competencies to be included into the model is driven by the business sector of the firm. The know-how competencies are strongly connected to the organization of the firm. They are basically referred to the “rules” (for example, the internal/external regulations) and the procedures (for example, the IT systems).

**2. Competency measurement**

According to the literature the 6-level scales are adopted to assess both the Requested and the Owned Competencies [1][6][7][9][8][10].

Eq. (1)  $0 \leq C \leq 5$  where C is Competency level

The Requested Competency proficiency levels describe the level of a competency required to perform a specific process successfully; these levels relate to the work required for the process. Different processes require different levels of proficiency for successful performance. Not all processes will require the highest level of proficiency and some may not require certain competencies at all [9]. The following proficiency scale has been adopted to assess the Requested Competencies [8].

PROFICIENCY SCALE

<i>Proficiency Level</i>	<i>Description</i>
0. None	<ul style="list-style-type: none"> <li>No use of competency required for the job</li> </ul>
1. Limited	<ul style="list-style-type: none"> <li>Limited use of competency required for the job</li> <li>Competency has been minimally demonstrated</li> </ul>
2. Basic	<ul style="list-style-type: none"> <li>Basic understanding or knowledge needed for the job</li> <li>Basic understanding and knowledge sufficient enough to handle routine tasks</li> </ul>
3. Proficient	<ul style="list-style-type: none"> <li>Detailed knowledge, understanding, and application of the competency</li> <li>Ability to handle non-routine problems and situations</li> </ul>
4. Advanced	<ul style="list-style-type: none"> <li>Highly developed knowledge, understanding, and application of the competency required to be successful in the job and organization (total mastery)</li> </ul>
5. Expert	<ul style="list-style-type: none"> <li>Specialist/Authority level knowledge, understanding, and application of the competency required to be successful in the job.</li> </ul>

**Fig. 1**

The Process-Requested Competency Set  $C_r$  is defined as “the set of the rates of all the competencies requested by a process”

Eq. (2)  $C_r = f(C_{r(1)}, C_{r(2)}, \dots, C_{r(k)})$  where: k = number of competencies requested by the process

The set of Process Requested Competencies may change over time, when some factors vary: the technology, the degree of automation, the external context, the relations with other processes, the regulations, etc. The determination of the Process Requested Competencies Set is affected by some arbitrariness, as a consolidated methodology to determine which level of competency is “the ideal one” for an effective performance of a process is not available. The error introduced by a subjective assessment is significantly reduced if the difference from a year to another is analysed.

With regards to Owned Competencies, the use of a graduated scale facilitates the identification of the degree of skill or mastery. Adaptation or combination of commonly used scales such as Blooms Taxonomy<sup>2</sup> and the Bondy rating scale<sup>3</sup> is frequent. A scale seeks to summarize the differences in the use of time, space, equipment and

<sup>2</sup> “Bloom’s taxonomy of educational objectives” [10] is a system for categorizing educational objectives according to a hierarchy of behaviors. The concept of taxonomy refers to the nature of the knowledge, skills and attitudes to be learned, in ranked order, with simple behaviors listed first and more complex behaviors listed thereafter.

<sup>3</sup> Kathleen Bondy [15] captures the essence of Bloom’s affective and psychomotor domains by applying the concept of a hierarchy of increasing competency to the development of a five-point rating scale for the evaluation of nursing students’ clinical performance.



expenditure of energy across the development continuum. The 5-level scale defined in the §2 is adopted to assess the Owned Competencies. The competency assessment process is based on the proficiency level description. The following scale is used to rate the level of achievement as it occurs in the workplace, classroom or daily life [15].

0. *None: You don't have this competence .*
1. *Limited: You are aware of information, ideas and situations related to this competency You've just started to find opportunities to work on this competency. You make initial assessments of what is expected of your role. Your understanding of the impact of your actions is limited.*
2. *Basic: You've demonstrated this competency and think about how to develop it further. You engage in conversations with others about how you can best contribute and how this competency is important.*
3. *Proficient: Your actions usually meet the expectations of yourself and others. You look for opportunities to apply this competency in other areas of your life.*
4. *Advanced: You've reached your overall goals and often think about opportunities to use and practice this competency. You consistently meet the expectations of yourself and others.*
5. *Expert: You have an overall mastery of this competency. You are considered to be a role model by others and regularly exceed expectations. Your work is of a very high or exceptional quality and has significant impact.*

The Common European Framework of Reference for Languages: Learning, Teaching, Assessment, abbreviated as CEFR, is a guideline used to describe achievements of learners of foreign languages across Europe and, increasingly, in other countries [12].

The competency assessment is the process of comparing an individual's competencies to those of a competency model. Assessments are systematic methods of gathering data under standardized conditions and reaching a conclusion regarding the knowledge, qualification and potential of an employee. Competency assessment is an ongoing process of continually building knowledge and skills. Organizations are much more dynamic now and competency assessment addresses the need to stay ahead of the curve. There is a number of different ways of performing competency assessment [13] [14]. The first is the so-called "self-assessment". Following this methodology, people assess themselves against a pre-determined set of competencies, and using a pre-determined evaluation scale. Often, in the self-assessment methodology the employee is also requested to define a certain number of "areas of strength" and of "areas of weakness".

Usually this methodology is used by the company in combination with another one (manager's evaluation and/or structured test and/or assessment center and/or manager's assessment). The manager of the organisational unit (office, division, and department) assesses all the employees and evaluates their level of competency. Another way to assess the competency is the structured test. This methodology usually refers to assessing recall of facts, concepts, principles, and basic application in a standard examination format. There are three common exam formats: multiple choice questions (MCQs), essay questions, and short-answer questions. Unfortunately such tests are available only for few competencies.

The Owned Competencies Set  $C_o$  encompasses all the competencies owned by the employee

Eq. (3)  $C_o = f(C_{o(1)}, C_{o(2)}, \dots, C_{o(m)})$  where:  $m$  = number of competencies owned

### 3. Competency Gap

The Competency Gap is the difference between the Requested Competencies and the Owned Competencies<sup>4</sup>

Eq. (4)  $G = C_r - C_o$  where:  $0 \leq G \leq 5$

Particular cases:

Eq. (5)  $G = 0 \rightarrow$  no Gap

Eq. (6)  $G < 0 \rightarrow$  owned competencies greater than requested competencies  $\rightarrow G = 0$

<sup>4</sup> A method for calculating the gap is illustrated in Russo D. *Competency Measurement Model* European Conference on Quality in Official Statistics (Q2016) Madrid, 31 May-3 June 2016 [16].



#### 4. Using the model

The competency map could be used to perform process and staff analysis based on the requested and owned competencies. Plotting in an x-y chart the process/role requested competency set, “generalist” and “specialised” processes can be distinguished. The first require a high number of competencies at a low level of proficiency. The latter require, on the contrary, fewer competencies with high skills.

PROCESS CLUSTERING BY REQUESTED COMPETENCY

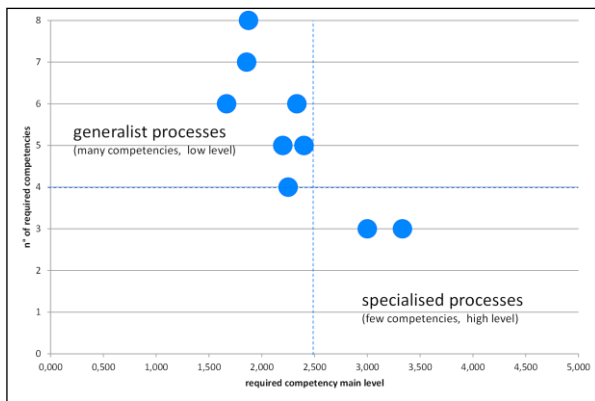


Fig. 2

HYPER-REGULATED ORGANISATION PROCESS MAP

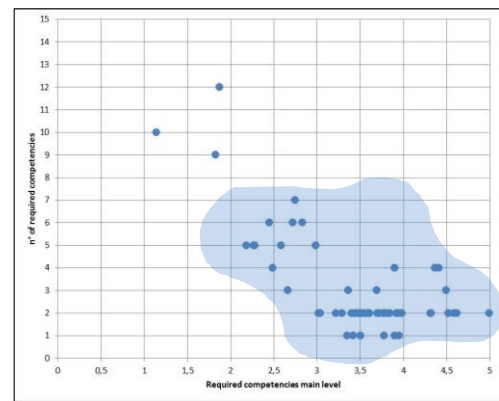


Fig.3

In a hyper-regulated environment a proliferation of specialised processes is frequently detected; in fact, the execution of the process activity is fully driven by the rules whose know-how is the only competence required. Another use of the competence map is the detection of the “key competencies”. A key competence can be spread over more than half processes. Detecting the key competence is very relevant to address the recruitment policy and the training program of the staff.

KEY COMPETENCIES RESOURCES

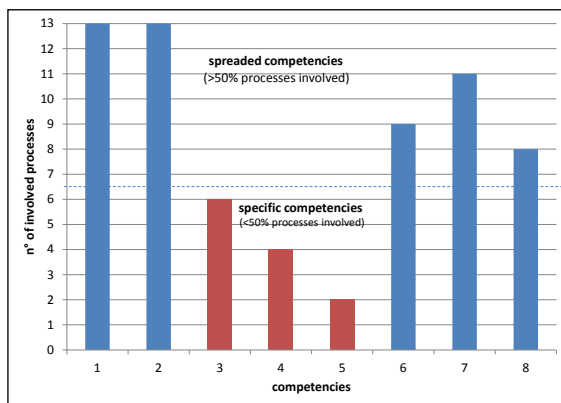


Fig. 4

CLUSTERING BY OWNED COMPETENCY

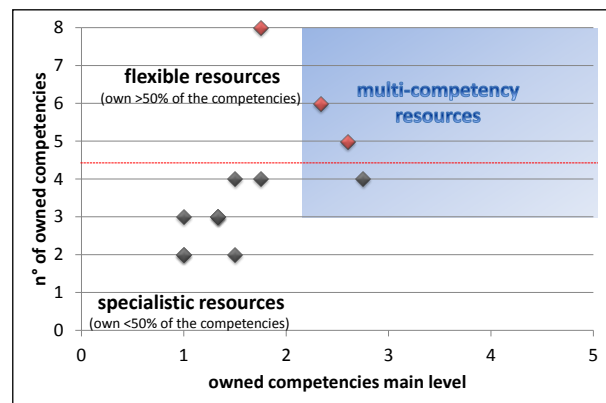


Fig. 5

The plot of the data of the resource owned competency set in an x-y chart shows two main categories: “flexible” and “specialist” resources, depending on the number of owned competencies (more or less than half of the total). Among flexible resources, the “multi-competency resources” can be highlighted. These resources are highly skilled in many competencies and consequently they are proficient in several processes. The availability of a large number of multi-competence resources (MCR) makes possible to manage the work-load peaks effectively: the MCR can be temporarily moved from a process to another without any training.

The main usage of the competency gap evidence is to design the training paths of the staff. According to the characteristic and to the potential of the people, specific training sessions can be planned and realised in a multi-



year perspective. The gap analysis provides robust guidance to optimize the allocation of the resources and the management of the turn-over (including the recruitment policy).

GAP ANALYSIS FOR DESIGNING THE TRAINING PATHS

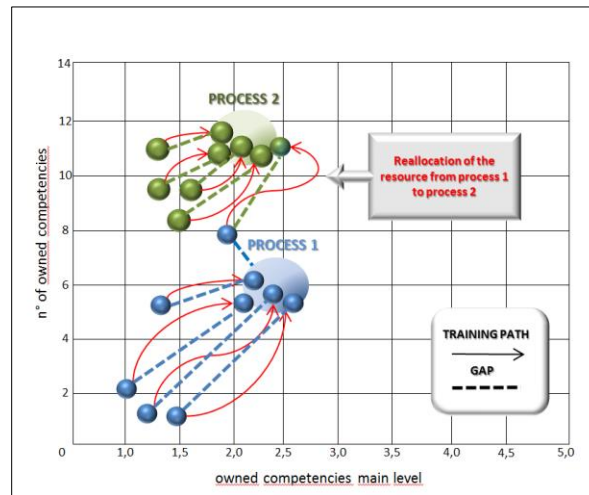


Fig.6

The analysis of the gap could also address the redesign of the processes, with the aim to reshape the required competency set (for example dropping the regulations requiring high-level knowledge of complicate and redundant controls). The gap must be measured in the time. It is interesting to compare the variation from one year to the other as a feedback of the training activities and of the other organisational actions. The relationship between the knowledge gap and the process productivity is an item that could be investigated by experimental studies. Intuition suggests that the bigger the gap, the worse the performance, but there is no strong statistical evidence of this at the moment.

5. Conclusions

Combining the relationship between staff and processes (“who does what”), the relationship between processes and skills (“what the staff should know to be able to work on a process”), and the relationship between staff and competencies owned (“what the staff currently knows”), it is possible to conduct an analysis of competencies, determining the gap between the desirable level of skills requested by the process and the current level of skills owned by the staff involved in the process.

The assessments obtained allow to perform analysis such as [3]:

- identifying the gap between the competencies needed by activities and competencies possessed by personnel and corporate entities;
- placing all available resources in the right roles with positive organizational effects;
- identifying critical resources that need improvement actions to develop their potential;
- assessing the change impact of movements of certain individuals in other companies or areas.

In addition, the competency literature includes a huge range of claimed benefits specific to HR processes in organizations [11]. In summary, these are:

- improved recruitment and selection practices through a focus on required competency;
- improved individual, organizational and career development programs;
- improved performance management processes due to improved assessment.

Finally, having a competency framework, and assessments based on it, provides a comprehensive picture of the organization skill map, its development needs, and potential leaders and thus the approach to effective talent



management could be defined. The employees get a better understanding of their potential career progression, reinforcing their commitment to the organization even further.

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