

## Assessing teamwork competence

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### Abstract

**Background:** In recent years, organizations of all types have undergone major changes, and teamwork is one of them. This way of working generates greater profits for an organization. This article aims to assess the teamwork competence of the employees of various Spanish companies in order to determine how effective the team members are in their professional actions. **Method:** We contacted 55 teams from different organizations and obtained a non-probabilistic sample comprised of 55 participants (subjects tested) and 218 observers (evaluators: coordinators and co-workers). The instrument used for data collection was the Teamwork Rubric (Torrelles, 2011) and data analysis was based on 360° feedback. **Results:** 80% of the teams analyzed obtained median scores for teamwork competence that were greater than 3, whereas 20% obtained scores between 2 and 3. **Conclusions:** The results showed that the workers in the companies studied had not fully acquired teamwork competence. It is necessary to find training solutions to improve their level of acquisition, particularly the dimensions of performance and regulation.

**Keywords:** teamwork competence, assesment 360°, rubric.

### Resumen

**Evaluación de la competencia de trabajo en equipo. Antecedentes:** En los últimos años las organizaciones han experimentado múltiples cambios y el trabajo en equipo es uno de ellos. Esta manera de trabajar genera más beneficio en las organizaciones. El presente artículo tiene como objetivo evaluar la competencia de trabajo en equipo de los empleados de diferentes empresas españolas para conocer las debilidades y potencialidades de los equipos en su acción profesional. **Método:** Se ha contactado con 55 equipos procedentes de diferentes organizaciones configurando así una muestra de carácter no probabilístico formada por 55 participantes (sujetos evaluados) y 218 observadores (sujetos evaluadores: coordinadores y compañeros de trabajo). El instrumento de recogida de los datos es la Rúbrica de Trabajo en Equipo (Torrelles, 2011) y su aplicación se ejecuta a través del método de evaluación 360°. **Resultados:** El 80% de los trabajadores muestran que tienen una media de 3 o superior en el nivel de adquisición de la competencia de trabajo en equipo, el 20% restante se encuentran entre 2 y 3. **Conclusiones:** Los resultados muestran que los trabajadores de las empresas españolas no tienen adquirida la competencia de trabajo en equipo en toda su globalidad, pues dimensiones como la regulación y la ejecución necesitan ser mejoradas.

**Palabras clave:** competencia de trabajo en equipo, evaluación 360°, rubrica.

In recent years, organizations of all types have undergone major changes, and there has been a notable shift towards more collaborative and cooperative ways of working together. Whereas until now, professional work could largely be done individually and in relative isolation, it is currently often necessary for two or more employees to interact in order to achieve the required results (Torrelles, 2011). The complexity of organizations implies working to meet common objectives or goals which are based on acquired roles and predetermined functions. The high level of competitiveness in the labour market and ongoing innovation produce demands that require a variety of skills, high levels of specialist knowledge, rapid responses and adaptability; it is only through teamwork that these needs can be met (Kozlowski, & Ilgen, 2006). Teamwork should therefore be considered a key

factor and a source of competitive advantage (Rousseau, Aubé, & Savoie, 2006a, 2006b; Tjosvold, 1991).

This new work paradigm has helped to increase productivity, innovation and the job satisfaction of employees (Ayestarán 2005; Rousseau et al. 2006a, 2006b). This model relegates individual and unaccompanied work to Taylorist and Fordist periods which are more typical of the 19<sup>th</sup> and 20<sup>th</sup> centuries (Parker, & Wall, 1998). As numerous studies have already shown, organizations that wish to adapt to change and to the structural transformations demanded by the present context will see the promotion of teamwork as an essential strategy for achieving their objectives (Alcover, Gil, & Barrasa, 2004; Aritzeta, & Balluerka, 2006; Ellis, Bell, Ployhart, Hollenbeck, & Ilgen, 2005; Hollenbeck, DeRue, & Guzzo, 2004; Kozlowski, & Ilgen, 2006; Miklavic, Kolenk, & Markic, 2007; Park, Henkin, & Egley, 2005).

Teamwork is now the main way of working and should generate greater profits for an organization than the work of an individual employee working alone (Alcover et al., 2004; Ellis et al., 2005; Hollenbeck et al., 2004; Rousseau et al., 2006b). Several experts in this field have provided objective data about teamwork in companies and other organizations. For example,

Kayes, Kayes and Kolb (2005) argue that in firms with more than 100 workers, 80% of workers establish working relationships with the rest of their colleagues and form teams. Lawler, Mohrman and Ledford (1992) stated that 91% of workers in companies resolve work-related problems through team meetings; Beckham (1998) observed that 40% of US workers work in teams; and Cohen and Bailey (1997) noted that while 60% of organizations used teamwork in the early 1990s, by the early 21<sup>st</sup> century, 82% of companies with more than 100 workers employed teamwork in their productive activity.

As a result, teams should be considered complex, dynamic and adaptable entities which embed themselves in multilevel systems and take into account the individual, the team and the wider organization. Hackman (1987) defined this ecological system as the INPUT-PROCESS-OUTPUT model of teamwork. This describes the essential components needed to increase the effectiveness of teamwork. It also explains its process and the cognitive, affective and behavioural aspects that mobilize it and the time that it requires (Cohen, & Bailey, 1997; González-Romá, 2008; Ilgen, Hollenbeck, Johnson, & Jundt, 2005; Kozlowski, & Ilgen, 2006; Rousseau, Aubé, Chiochio, Boudrias, & Morin, 2008; Gil, Rico, & Sánchez-Manzanares, 2008). Working in a team is not easy; it requires certain knowledge and certain skills and attitudes that allow the individual to adapt to specific situations within a given context and to deal with a variety of different situations as efficiently, independently and flexibly as possible. If individuals do not possess the required knowledge, they will find it difficult to acquire the skills and abilities needed to be able to work with others in a cooperative and collaborative way. As a result, they will also probably find difficulties when working in organizations that employ this way of working or others based on this type of system.

#### From teamwork to teamwork competence

In this ever more complex society, there is not only a need for professionals who have developed certain specific technical and methodological competences to a high level, but also for other more transversal ones, such as participatory and/or social competences. The latter particularly emphasize teamwork competence.

Much has already been written about teamwork, but discussion about teamwork competence is relatively new and to date, few authors have tried to define this construct (Baker, Hovarth, Campion, Offerman, & Salas, 2005; Cannon-Bowers, Tannenbaum, & Salas, 1995; Salas, Burke, & Cannon-Bowers, 2000), which had not been previously defined. However, this difficulty arises when we consider teamwork competence as one that integrates a number of other competences which include those of communication, social relations, conflict resolution and achieving goals. According to the theory of Hackman (1987) and Beaudin (1996), teamwork competence is a multidimensional construct and as shown in the following table, the definition of teamwork competence may depend on the perspective from which it is studied.

Even so, there are many points and elements in common. For Cannon-Bowers et al. (1995, p.336-337), Ellis et al. (2005), Lerner, Magrane and Friedman (2009), and Weaver, Rosen, Salas, Baum, King (2010), teamwork competence also includes: “the required knowledge, principles and concepts that underlie a team’s effective

task performance; the repertoire of skills and behavior required to perform the team task effectively; and the attitudes considered appropriate of team members in order to foster effective team performance.”

Along the same lines, Torrelles (2011, p. 209) understood teamwork competence as “the set of knowledge, skills and attitudes required to work with others in carrying out tasks and achieving common goals, sharing information, distributing tasks, taking responsibility, solving problems and contributing to improvement and collective development.”

#### Assessing teamwork competence

There can be no doubt as to the potential interest in evaluating teamwork competence in companies and other organisations. Bailey, Berg, and Sandy (2001) reported benefits deriving from the introduction of teamwork and reported that this way of working was best suited for organizations given that it increased the performance of their employees. Appelbaum, Bailey, Berg, and Kalleberg (2000) noted that companies with participative work systems had more receptive employees than those in which more traditional work systems were employed.

Similarly, Geary and Dobbins (2001) indicated that teamwork offered companies higher levels of performance and greater productivity. Edwards and Wright (1998) identified improvements in the effectiveness of workers as a result of teamwork, although their studies also indicated that the effects of teamwork also depended on a number of contingent factors: the objectives of the team leader, the type of teams involved and the context of the company in which these teams operated. For Bacon and Blyton (2003), teamwork is an important resource for reaching common goals, whether personal or those of the company.

Researchers have found that in companies with more than 500 workers, 80% work in teams (Robbins, 2003). Organizations know that teams are more effective than individuals because the members of a team can share the workload, and this makes it possible for them to find more complex, innovative and comprehensive solutions to organizational problems, monitor the behavior of their teammates and combine different areas of expertise (Mathieu, Heffner, Goodwin, Salas, & Cannon-Bowers, 2000; Salas, Sims, & Burke, 2005; Sundstrom, McIntyre, Halfhill, & Richards, 2000). However, despite their theoretical effectiveness, researchers have found that teams are not always successful due to failings in teamwork competences of some team members and particularly those who were chosen for their technical and methodological skills (Hollenbeck et al., 2004; Marks, Sabella, Burke, & Zaccaro, 2002). Although efforts have been made to develop special programmes to train people who must work in team environments (Stevens and Yarish, 1999), to date, researchers have failed to devote sufficient attention to assessing teamwork competence and finding ways in which to further develop it.

Team members need to be aware of their zone of current and proximal development in relation to teamwork competence in order to know their own strengths and weaknesses and thereby be able to improve their present levels of competence and acquire appropriate new ones through training programmes.

The purpose of this study was to assess teamwork competence of the employees of various Spanish companies in order to know

*Table 1*  
Teamwork Competence

Authors	Components that form part of the definition of teamwork competence	
Stevens, & Campion, 1994	Conflict Resolution, Collaborative Problem Solving, Communication, Goal Setting and Performance Management, Planning and Task Coordination	
Baker, Day, & Salas, 2006	Team Leadership, Mutual Performance Monitoring, Backup Behavior, Adaptability, Shared Mental Models, Communication, Team/Collective Orientation, Mutual Trust	
Rousseau, Aubé, & Savoie, 2006b	Preparation of Work Accomplishment, Work Assessment Behaviors, Task-Related Collaborative Behaviors, Team Adjustment Behaviors, Management of Team Maintenance	
Leggat, 2007	Skills	Leadership, Ability to Influence, Negotiation
	Knowledge	Organizational Goals & Strategies, Self-Awareness of Strengths and Weaknesses, Team Process & Development
	Traits	Respect for Others & Cooperative Attitude
	Motives	Commitment to Working Collaboratively, Commitment to Organization, Commitment to a Quality Outcome,
Chakraborti, Boonyasai, Wright, & Kern, 2008	Leadership, Mutual Performance Monitoring, Feedback, Backup Behavior, Ability to Adapt, Team Orientation, Trust, Communication, Shared Mental Models	
Cortez, Nussbaum Woywood, & Aravena, 2008	Team Orientation, Team leadership, Monitoring, Feedback, Back-up, Coordination, Communication	
Fernandez, Kozlowski, Shapiro, & Salas, 2008	Planning Processes	Mission analysis, Goal specification, Strategy formulation
	Action Processes	Monitoring Progress Toward Goals, Systems Monitoring and Adaptation. Back-up Behavior, Coordination
	Reflection Processes	Debriefing
	Supporting Mechanisms	Leadership, Team Cognition, Closed-loop Communication
Lerner, Magrane, & Friedman, 2009	Monitoring, Feedback, Closed-loop Communication, Support	
Humphrey, Karam, & Morgeson, 2010	Behavioral Dimension	Performance Quality, Performance Quantity, In-role Performance, Extra-role Performance, Goal Attainment, Counterproductive Work Behavior
	Affective Dimension	Satisfaction with the Team, Viability, Cohesion, Team Identification
	Cognitive Dimension	Innovation, Potency, Team Learning
Weaver, Rosen, Salas, Baum, & King, 2010	Attitudes	Mutual Trust, Collective Efficacy, Team/Collective Orientation Psychological Safety
	Behavior	Closed-loop Communication, Team Leadership, Mutual Performance Monitoring, Backup/Supportive Behavior, Conflict Management, Mission Analysis, Team Adaptation
	Cognition	Accurate and Shared Mental Models, Cue-Strategy Associations
Skjerve, Kaarstad, & Holmgren, 2015	Attitudes-Towards Colleagues and the Plan, Back-up Behavior, Communication, Coordination, Decision Making, Leadership, Learning and Refreshing of Competencies.	

how effective the members of each team were in their professional actions. Based on 360-degree assessment (Berk, 2009; Maurer, Barbeite, & Mitchell, 2002), we first used the rubric RUTE approach (Torrelles, 2011; Torrelles, C., Coiduras, J., Carrera, X., & Isus, S., 2014) and then the data collection tool to study the level of acquisition of teamwork competence.

This study makes several new contributions to the existing literature on teamwork. First, it should be stressed that to the best of our knowledge, this is one of the first studies conducted in Spain to assess teamwork competence from an individualistic point of view in different companies. Secondly, we should underline that we used a tool for collecting data which was specifically developed and validated for the Spanish context and that we accompanied its use with a method of evaluation (360-degree feedback) which differs from those traditionally employed in our country. If we bear in mind the fact that the majority of the methods and tools that have been used to evaluate teamwork competence until now have been, and continue to be, mainly based on personality tests which are used to

predict the acquisition of competences (Baker, 1998; Baker, & Salas, 1997; Brannick, Salas, & Prince, 1997; Faure, 2009; Kivimaki, & Elovaino, 1999; Proudfoot et al. 2009; Strating, & Nieboer, 2009), we can see why this new approach is particularly relevant.

## Method

### *Participants*

For the present study, the participants were recruited from different Spanish organizations. We did this by configuring a non-probabilistic sample, consisting of 55 participants and 218 observers, which produced 55 teams.

The criteria used for selecting the observers and participants were as follows:

(a) The observers included at least one coordinator and two co-workers from the same organization; (b) the participants had to assess themselves; (c) the participant's professional experience

had to have been gained within a team; and (d) the teams had to have been consolidated and to have operated as such for a period of more than three months.

*Instrument*

The tool chosen to collect data was the Rubric RUTE – Rubric of Teamwork- (Torrelles, 2011, p.292-294). This is an assessment tool designed to measure criteria and standards by levels and using scales which allow it to determine the level of teamwork competence that each participant has acquired based on Torrelles, C., Coiduras, J., Isus, S., Carrera, X., Paris, G., & Cela, J. M.

(2011), Table 2: 4 Dimensions (categories that cover the broadest definition of the competence), 15 Components (subcategories of each dimension of the competence), 34 Elements (the specific aspects that make up each component), and 136 Indicators (four different levels of practical evidence or results relating to the acquisition of each element of the competence on a scale ranging from 1 (low acquisition) to 4 (high acquisition)).

This tool was chosen for this research because it is related of the theory of Hackman (1987) which considers the construction and the process of the team; secondly it is an instrument validated in the Spanish context, and finally, its backgrounds summarize multiple perspectives and theories about teamwork competence.

Teamwork Competence		
Dimension	Components	Elements
1. Identity	1.1. Goals	1.1.1 Identifying the goals 1.1.2 Knowledge of the goals 1.1.3 Working towards goals
	1.2. Sense of belonging	1.2.1 Integration within the team
	1.3. Roles	1.3.1 Adoption 1.3.2 Performance
	1.4. Adaptability	1.4.1 Proposals for adaptation 1.4.2 Adaptation of the activity
	1.5. Teamwork climate	1.5.1 Interpersonal relations 1.5.2 Working conditions
	1.6. Commitment	1.6.1 Involvement in the team
2. Communication	2.1. Information	2.1.1 External information search 2.1.2 Internal information request 2.1.3 Information sharing
	2.1. Personal interaction	2.2.1 Personal attitude
	3.1. Planning	3.1.1 Identify tasks 3.1.2 Sequencing of tasks 3.1.3 Distribution of tasks 3.1.4 Predicting and preparing the resources required
3. Performance	3.2. Decision Making	3.2.1 Analysis for decision making 3.2.2 Participation 3.2.3 Consensus
	3.3. Carrying out the tasks	3.3.1 Performing the tasks assigned 3.3.2 Sharing Information about the difficulties encountered 3.3.3 Participation in the resolution of contingencies
	3.4. Monitoring performance	3.4.1 Team coordination 3.4.2 Self-monitoring tasks
	4.1. Collaborative problem solving	4.1.1 Detecting conflicts 4.1.2 Alternative proposals 4.1.3 Conflict resolution
4. Regulation	4.2. Negotiation	4.2.1 Using strategies 4.2.2 Reaching agreements
	4.3. Making improvements	4.3.1 Suggestions for improvement 4.3.2 Introducing processes for improvement

Procedure

The 360-degree feedback approach (which is known in the French-speaking world as the “Évaluation Multi-acteur”) was used to assess teamwork competence. These 360° assessments use a measurement tool with a rating scale to gather information that is completed by a number of people from the individual’s sphere of influence in order to provide them with relevant feedback. This method allows us to assess the competences and professional performance of the subject (self-assessment)— called “the participant”—with the help of different informants (hetero-evaluation) —referred to as “the observers” (Figure 1). These observers could be the participant’s coordinators, superiors, co-workers, subordinates, internal or external clients, suppliers, and/ or other participants (Dalessio, 1998; Levy-Leboyer, 2000).

Data analysis

The analysis and interpretation of the research results was organized as follows. First, we conducted an exploratory analysis of the data obtained from the participants in the 55 teams studied. We then observed the results obtained based on previous analysis and performed the non-parametric Kruskal-Wallis test in order to study the median values of the four dimensions and the final rubric scores for the different teams. Finally, we made inferences about a correlation between the different self-assessments and hetero-evaluations of the coordinators and co-workers using the Pearson product moment correlation coefficient with the t-Student test as the contrast statistic.

Results

This research was conducted with 55 workplace teams in which 58% of their members were men and 42% women. The average age of the participants was 41 years, with 27% of the participants being between 18 and 22, 27% between 23 and 27, 15% between 28 and 32, 23% between 33 and 37, and only 7% between 53 and 57. The academic backgrounds of the participants were homogeneous, with all of them having had university education. In the case of the length of time that the participants had been working in the same team, it should be underlined that 45% had between 3 months and 2 years’ experience, 38% had between 3 and 5 years, 13% between 6 and 10 years and only 4% between 11 and 15 years.

Before analyzing our data using descriptive statistics, we first studied their distribution. We applied the Kolmogorov-Smirnov test to the distributions of the four dimensions studied (identity,

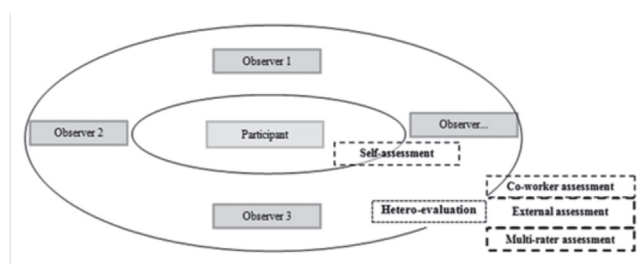


Figure 1. 360-degree Feedback

communication, performance and regulation) and also to the final score obtained from the rubric. We thereby obtained the statistical significance of Z for the four variables mentioned; this was less than 0.05, which led us to the conclusion that these variables did not follow a normal distribution.

The variables that we studied were biased. In this case, we followed the same criteria as Triola (2009, p.85) and used the median value as a measure of central tendency and the semi-interquartile range as a measure of dispersion. We decided that the best way to present the results was through a series of boxplots of the different variables, showing the code for each team on the axis of abscissas and the values of the different variables (that ranged from 1 to 4) on the axis of ordinates. The median value for each team coincided with the midpoint of the box and the semi-interquartile range corresponded to half the length of the box.

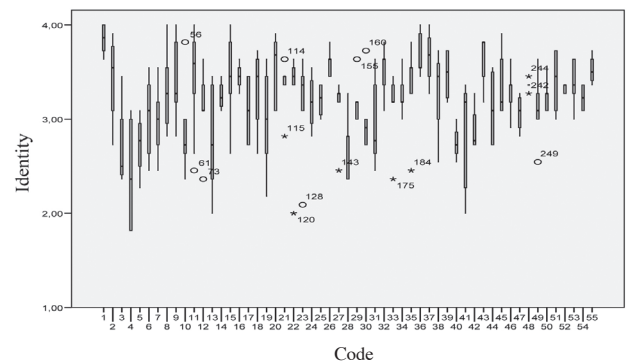


Figure 2. Identity dimension

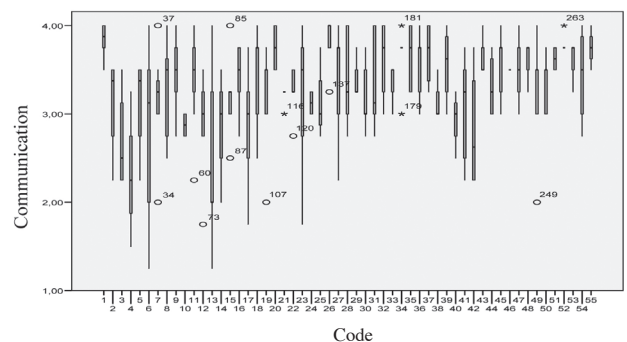


Figure 3. Communication dimension

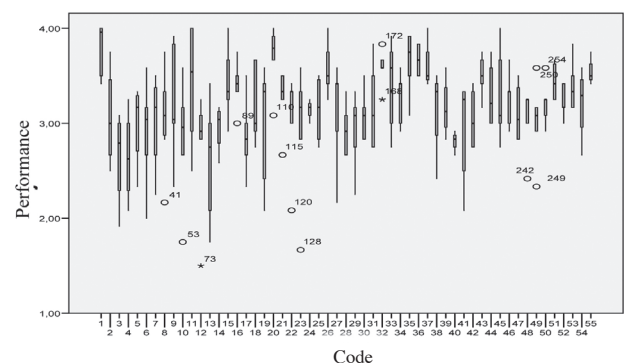


Figure 4. Performance dimension

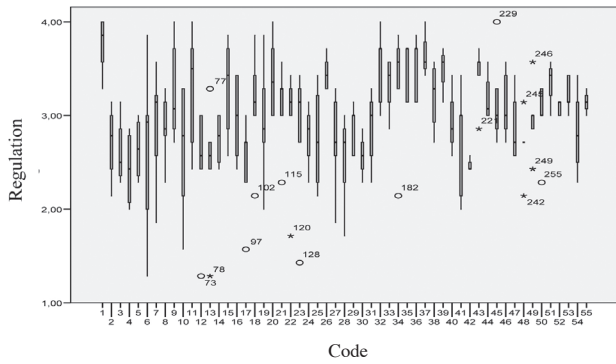


Figure 5. Regulation dimension

Eighty percent of the teams analyzed obtained median scores for teamwork competence that were greater than 3, while 20% obtained scores of between 2 and 3. As far as the different dimensions were concerned, we estimated that 78% of the teams obtained average scores of above 3 for the Identity dimension, while 83.6% obtained scores above this level for the Communication dimension, 74.5% for the Performance dimension, and 43.7% for the Regulation dimension. Another aspect to underline was the fact that 56.3% of the teams registered their lowest average scores for the Regulation dimension.

The non-parametric Kruskal-Wallis test was applied to test the null hypothesis that the independent samples came from populations with equal medians. The requisites for running this test were (Triola, 2009, p.702):

- 1) Having at least three independent samples
- 2) Each sample should include at least five observations

We excluded teams from our data set that did not comply with the second condition; this left us with a total of 37 teams. The descriptive statistics obtained are presented in the following table:

The results of the Kruskal-Wallis test showed a statistical significance for the chi-square test of less than .000 for all of the variables considered except the communication dimension; the value for this variable was .007. These results allowed us to reject

Variable	Median	Semi-interquartile range
Total Rubric	3.559	0.162
Identity	3.636	0.182
Communication	3.750	0.250
Performance	3.583	0.167
Regulation	3.429	0.143

	Total rubric score	Identity	Communication	Performance	Regulation
Chi-square	81.220	73.771	61.217	73.784	80.864
G1	37	37	37	37	37
Sig. asintót.	.000	.000	.007	.000	.000

a Kruskal-Wallis Test  
b Grouping variable: Code

the null hypothesis of equal medians for the different teams for the four different dimensions and for the final score for the rubric with a confidence level of 99%.

In the process of inferential analysis of the data, we studied the Pearson product-moment correlations (r) between the self-assessments and hetero-evaluations conducted by the coordinator and co-workers and also the level of statistical significance obtained with the t-Student statistic.

As the data show, the correlation between the different assessment modalities was positive. This showed that there was a significant level of correlation at the 99% confidence level between the impressions of the observers (hetero-evaluation, coordinator assessment) and participants. This meant that the results obtained from the participants themselves did not differ from the evaluations of their superiors. In the case of the self-assessment and co-worker assessment, we obtained a significant correlation at the 95% confidence level, with a value of 0.286.

### Discussion

The present study shows that workers in Spanish companies can be characterised by their communicative dimension. This facilitates exchanges of information and interaction between different team members. In Spanish companies, the identity dimension also appears to be relevant. According to our findings, aspects such as achieving work goals, belonging to a group, acquiring a professional role, being adaptable and feeling committed to work all help to define the identity and configuration of the team within the Spanish context. However, although other dimensions, such as Performance and Regulation, registered average level scores, they remained amongst the areas for which there is still room for improvement on the part of workers' organizations. We can therefore say that the employees studied tended to exhibit certain minor weaknesses, in areas such as planning, decision making, task completion and monitoring, which were related to the

Self-assessment	
Hetero-evaluation	0.395**
Sig. (bilateral)	0.003
Co-worker assessment	0.286*
Sig. (bilateral)	0.034
Coordinator assessment	0.414**
Sig. (bilateral)	0.002

\*\* The correlation is coherent at the 0.01 level (bilateral)  
\* The correlation is coherent at the 0.05 level (bilateral)

Performance dimension. They also showed notable weaknesses in conflict resolution, negotiation and processes of improvement in the Regulation dimension.

The current study found that the workers in the Spanish companies studied had not fully acquired teamwork competence. It is therefore necessary to consider the training solutions required to help improve the level of acquisition of teamwork competence. From the point of view of research, it is also necessary to continue our work to answer a number of new scientific questions relating to: the nature of the relationship between the acquisition of teamwork

competence and the effectiveness of teams; whether there is a relationship between the Regulation dimension and Emotional Intelligence; and whether there is a relationship between the Regulation dimension and culture.

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