

Designing effective teams: concept and measurement issues

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Abstract

In this paper, we review the research on organizational teams. The aim is delimiting the conceptual space of effectiveness and determining team-level measurement issues. According to the existence of different types of teams –work team, parallel team, project team and management team–, we conclude that effectiveness is a multidimensional concept with three dimensions: performance, attitudinal outcomes and behavioural outcomes. We review the different variables of effectiveness for each type of team. In relation with team-level measurement issues, we conclude the need to use multiple data sources and multimethod analyses incorporating consensus and aggregation methods, as well as observation and key informants.

Keywords: Effectiveness, teams, measurement.

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1. Introduction

Nowadays, there is a great interest for studying organizational teams. This interest is concerned with the increasing use of teams in companies. The use of teams have expanded dramatically in response to competitive challenges and organizational needs of flexibility and adaptation (Rodríguez del Bosque Rodríguez et al, 2005). The reason is that firms improve their outcomes if they use teams. In this sense, literature recognizes that teams increase, at least, employee satisfaction and commitment to organization (Stewart and Barrick, 2000) and move the firm closer to a set of objectives (Doolen et al., 2003; Tata and Prasad, 2004).

Understanding effectiveness is a key issue in team research. In this sense, several models have been developed with an objective: to identify multiple factors of effectiveness and their relationships with success (Kirkman et al., 2001). Given this purpose, researchers have had problems in delineating the boundaries of team effectiveness and operationalizing this construct. Problems are related to distinguish between determinant factors and criteria of effectiveness.

The main purpose of this study is to clarify the team effectiveness construct and to find the best way for assessing it. With this objective the study: 1) tries to delineate the space construct of team effectiveness reviewing previous researches and showing used variables and measures in them; 2) analyses the problems in gathering data and measuring in this level of analysis; 3) assesses what variables and measures are more appropriate according to team type and offers a proposal of measurement issues for future research.

2. Delineating the construct space of team effectiveness

2.1. Dimensions

The purpose of this section is to identify dimensions or criteria of team effectiveness. Two types of models of team effectiveness can be distinguished. The first one is unidimensional and uses objective measures of *team performance* (Kolodny and Kiggundu, 1980; Shea and Guzzo, 1987) or of the degree of real productivity (Steiner, 1972). The second one is multidimensional.

mensional, since it supposes that team effectiveness depend on something else apart from performance or productivity (Hackman, 1987; Hackman and Morris, 1975; Hackman and Walton, 1986; Nieva et al., 1978).

Several models have been developed under the multidimensional perspective. Thus, apart from performance, *satisfaction* was aggregated by Shiflett (1979), Gladstein (1984) and Capelleras Segura y Veciana Vergés (2004). Cummings (1981) and Hackman and colleagues considered satisfaction and commitment. Sundstrom et al. (1990) clustered satisfaction and commitment in team viability. Finally, Cohen and Bailey (1997) categorized effectiveness into three major dimensions according to the team's impact: 1) *performance effectiveness* (productivity, efficiency), 2) *attitudinal outcomes* (satisfaction, commitment and trust in management) and 3) *behavioral outcomes* that included absenteeism, turnover or safety.

In sum, a broad approach to effectiveness has been taken by previous research. Effectiveness is categorized into the three proposed dimensions by Cohen and Bailey (1997). However, these dimensions are not equally important and significant for each type of team. The importance of each one will be concerned with team values and activities. Thus, depending on the team values and activities, dimensions and variables may be weighed up.

2.2. Variables and measures

Depending on the characteristics of the different types of teams, outcomes variables and its measures will be different (Cohen and Bailey, 1997; Hackman and Walton, 1986; Sundstrom et al., 1990). To obtain some conclusions about variables and measures, a review of team researches has been done. These conclusions are:

- Work teams: recent studies use objective and subjective measures of team performance. Objective measures are specific to the task and the type of team (for example, technician repair and response times: Wageman, 1995; sales: Gladstein, 1984 or Shea and Guzzo, 1987; client complaints: Cohen and Ledford, 1994). Subjective measures are gathered through survey questions focused on perceptions of overall team performance of team members themselves

(Doolen et al., 2003; Drach-Zahavy and Somech, 2001; Gladstein, 1984), of managers (Fry and Slocum, 1984; Hyatt and Rudy, 1997; Tata and Prasad, 2004) or of both of them (e. g. Alper et al., 1998; Campion et al., 1996; Cohen et al., 1997; Gibson et al., 2003). Amount and quality of work (Cohen et al., 1994, 1996 and 1997), productivity (Tata and Prasad, 2004), global performance (Liden et al., 1997; Tata and Prasad, 2004) and customer satisfaction (Mathieu et al., 2006; Tata and Prasad, 2004) are highlighted as subjective measures.

Many attitudinal and behavioral variables are also assessed. Among the most common are satisfaction (Campion et al., 1993 and 1996, Doolen et al., 2003), commitment to the organization, trust and perceived positive change (Cohen and Ledford, 1994; Cohen et al., 1996, 1997) –attitudinal variables– absenteeism, turnover and safety (Cohen and Ledford, 1994; Cohen et al., 1996, 1997) –behavioral variables. Attitudinal and behavioral variables are captured through subjective and objective measures, respectively. Moreover, behavioral variables are used to assess the success of self-managing teams.

- Parallel teams: recent studies also use three effectiveness dimensions. Cognitive task performance (Pelled, 1996a), internal and external perceived performance (Jehn, 1994; Jehn et al., 1997) and the range of perspectives shown in evaluating the situation, problem identification, alternatives generated and quality of solutions (Watson et al., 1993). Pearce et al. (2002) add to the Watson et al. (1993) measures: change, organizing and planning, interpersonal, value and overall effectiveness. They are some of the variables of performance effectiveness, captured through subjective measures. Team satisfaction is also assessed in this kind of studies (Jehn, 1994; Jehn et al., 1997) and trust (Appelbaum y Gonzalo, 2007). Behavioral outcomes are employed by Pelled (1996a), who considers turnover variable in her theoretical study.
- Project teams: the most frequently used measure of project team effectiveness is external perceptions gathered of managers or super-

visors. Followed by internal team perceptions and, finally, by external perceptions of customers or other stakeholders.

In general, perceived performance is rated using six variables: adherence to budgets, adherence to schedules, innovation, project quality, overall performance or efficiency and outcomes of interactions among team members. Recently, Rickards et al. (2001) measure also team productivity. Additional items included are satisfaction, commitment to organization and trust (Baldwin et al., 1997; Porter and Lilly, 1996).

- Management teams: the researches in management teams define effectiveness as firm performance and use objective measures. The most common rated variables are return on equity (Bunderson and Sutcliffe, 2002; Finkelstein and Hambrick, 1990), return on assets (Murray, 1989; Wiersema and Bantel, 1993), sales growth (Eisenhardt and Schoonhoven, 1990; Simons, 1995; Rio Araujo y Varela Neira, 2006), total return to shareholders (Haleblian and Finkelstein, 1993; Murray, 1989), change in sales and change in profitability (Simons, 1995).

Nevertheless, other studies consider decision quality (Amason, 1996; Janssen et al., 1999), contribution to decision (Kirchmeyer and Cohen, 1992), share information (Bunderson and Sutcliffe, 2002) and task performance (Jehn, 1995; Schweiger et al., 1986; Martell y Mansilla, 2006) variables at the team-level of analysis and rated with subjective measures.

Attitudinal outcomes are also taken into account for assessing effectiveness of management teams. Specifically, some of these variables are consensus –understanding and commitment to the decision– (Amason, 1996), team commitment (Schweiger et al., 1986) and satisfaction (e. g. Amason, 1996; Janssen et al., 1999; Jehn, 1995). Few studies focus on behavioral outcomes, although turnover from both the team and the firm is studied the most. Finally, Knight et al. (1999) and Senise Barrio y Matías Reche (2005) use strategic consensus as an outcomes variable. They define it as the adherence of management team to organizational strategy.

Table 1a. Dimensiones, variables and measures of team effectiveness: work teams

TYPES OF TEAMS	PERFORMANCE	ATTITUDINAL OUTCOMES	BEHAVIORAL OUTCOMES
Work teams	Subjective measures - Productivity (Campion et al., 1993; Campion et al., 1996; Cohen et al., 1996; Cohen et al., 1997; Gibson et al., 2003) - Production (Drach-Zahavy y Somech, 2002) - Quality (Campion et al., 1993; Campion et al., 1996; Cohen et al., 1996; Cohen et al., 1997; David et al., 1989; Doolen et al., 2003; Gibson et al., 2003) - Costs (Cohen et al., 1996; Cohen et al., 1997) - Service or customer satisfaction (Campion et al., 1993; Campion et al., 1996; Gibson et al., 2003; Gladstein, 1984; Hyatt y Rudy, 1997; Shea y Guzzo, 1987) - Overall performance (David et al., 1989; Doolen et al., 2003; Fry y Slocum, 1984; Gladstein, 1984; Jehn, 1995; Pagell y Lepine, 2002) - Security (Doolen et al., 2003) - Amount of work, initiative, cooperation, technical competence, dependence, leadership and communication effectiveness (David et al., 1989) - Schedule (Doolen et al., 2003) - Timeliness (Gibson et al., 2003) Objective measures - Productivity (Campion et al., 1993; Jehn, 1995) - Sales (Gladstein, 1984; Shea y Guzzo, 1987b) - Technician repair (Wageman, 1995) - Response time (Hyatt y Rudy, 1997; Wageman, 1995) - Percentage of interrupted calls, hours of maintenance (Hyatt y Rudy, 1997) - Client complaints (Cohen y Ledford, 1994)	Subjective measures - Employee satisfaction (Campion et al., 1993; Campion et al., 1996; Doolen et al., 2003) - Team satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Gladstein, 1984; Jehn, 1995) - Job satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Gladstein, 1984; Wageman, 1995) - Client service satisfaction (Gladstein, 1984) - Growth satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Social satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Commitment to the organization (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Fry y Slocum, 1984) - Attempt of team leaving (Jehn, 1995 y 1997) - Perceived positive change (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Trust (Cohen et al., 1996; Cohen et al., 1997)	Objective measures - Turnover (O'Reilly et al., 1989) - Accidents and security (Cohen y Ledford, 1994; Cohen et al., 1996) - Absenteeism (Cohen y Ledford, 1994; Cohen et al., 1996)

Table 1b. Dimensions, variables and measures of team effectiveness: self-managing teams

TYPES OF TEAMS	PERFORMANCE	ATTITUDINAL OUTCOMES	BEHAVIORAL OUTCOMES
Self-managing teams	Subjective measures - Production (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Liden et al., 1997) - Quality (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Janz et al., 1997; Jong et al., 2005; Liden et al., 1997; Tata y Prasad, 2004) - Productivity (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Tata y Prasad, 2004) - Costs (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Mathieu et al., 2006; Tata y Prasad, 2004) - Efficiency (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997; Janz et al., 1997; Tata y Prasad, 2004) - Overall performance (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Initiative (Liden et al., 1997) - Timeliness (Janz et al., 1997; Tata y Prasad, 2004) - Machine reliability and response time (Mathieu et al., 2006; Tata y Prasad, 2004) - Customer satisfaction (Mathieu et al., 2006; Tata y Prasad, 2004) - Service profitability (Jong et al., 2005) Objective measures - Performance of business office (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997)	Subjective measures - Job satisfaction (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Growth satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Social satisfaction (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Team satisfaction (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Customer satisfaction (Mathieu et al., 2006) - Commitment (Alper et al., 1998; Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Trust (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Perceived positive change (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997)	Objective measures - Accidents and security (Cohen y Ledford, 1994; Cohen et al., 1996; Cohen et al., 1997) - Absenteeism (Cohen y Ledford, 1994; Cohen et al., 1996)

Table 1c. Dimensions, variables and measures of team effectiveness: parallel teams

TYPES OF TEAMS	PERFORMANCE	ATTITUDINAL OUTCOMES	BEHAVIORAL OUTCOMES
Parallel teams	Subjective measures - Approaches to analyze problems, identify problems, solutions, quality, organize and planning, interpersonal performance, values and change (Pearce et al., 2002; Watson et al., 1993;) - Task performance (Pelled, 1996a; Jehn, 1994; Jehn et al., 1997) -Overall effectiveness (Pearce et al., 2002)	Subjective measures - Team satisfaction (Jehn, 1994; Jehn et al., 1997) - Trust (Appelbaum y Gonzalo, 2007)	Subjective measures - Turnover (Pelled, 1996a)

Table 1d. Dimensions, variables and measures of team effectiveness: project teams

TYPES OF TEAMS	PERFORMANCE	ATTITUDINAL OUTCOMES	BEHAVIORAL OUTCOMES
Parallel teams	- Outcomes (Baldwin et al., 1997; Henderson y Lee, 1992; Pelled, 1996b; Pelled et al., 1999) - Interactions effectiveness of teams (Baldwin et al., 1997; Jehn et al., 1997) - Product amount (Saavedra et al., 1993) - Product quality (Janz et al., 1997; Pelled, 1996b; Saavedra et al., 1993) - Efficiency (Henderson y Lee, 1992; Janz et al., 1997; Pelled, 1996b; Pelled et al., 1999; Gupta et al., 1994) - Timeliness (Janz et al., 1997; Henderson y Lee, 1992) - Reputation (Pelled, 1996b) - Creativity and productivity (Rickards et al., 2001)	- Team satisfaction (Sessa et al., 1993; Sessa, 1996; Baldwin et al., 1997; Janz et al., 1997) - Job satisfaction (Baldwin et al., 1997) - Commitment to the team (Janz et al., 1997; Porter y Lilly, 1996; Sessa et al., 1993; Sessa, 1996) - Trust (Porter y Lilly, 1996)	- Subjective measures

Table 1e. Dimensions, variables and measures of team effectiveness: management teams

TYPES OF TEAMS	PERFORMANCE	ATTITUDINAL OUTCOMES	BEHAVIORAL OUTCOMES
Parallel teams	Subjective measures - Decision quality (Amason, 1996; Amason y Schweiger, 1994; Edmondson et al., 2003; Janssen et al., 1999; Kirchmeyer y Cohen, 1992; Miliken y Vollrath, 1991; Priem y Price, 1991; Priem et al., 1995) - Contribution to the decision (Kirchmeyer y Cohen, 1992) - Task performance (Jehn, 1995; Pelled, 1996a; Schweiger et al., 1986) - Information sharing (Bunderson y Sutcliffe, 2002)	Subjective measures - Consensus (commitment to decisions and decisions comprehension) (Amason, 1996; Amason y Schweiger, 1994; Cosier y Dalton, 1990) - Strategic consensus (Knight et al., 1999) - Commitment to the team (Schweiger et al., 1986) - Attempt to leave the team (Jehn, 1995 y 1997) - Affective acceptance (team satisfaction, decision satisfaction, job satisfaction) (Amason, 1996; Amason y Schweiger, 1994; Cosier y Dalton, 1990; Janssen et al., 1999; Jehn, 1995; Miliken y Vollrath, 1991; Priem y Price, 1991; Priem et al., 1995; Schweiger et al., 1986)	Subjective measures - Turnover (Pelled, 1996a; Wiersema y Bantel, 1993)
	Objective measures - Return on capital (Bunderson y Sutcliffe, 2002; Finkelstein y Hambrick, 1990) - Return on assets (Murray, 1989; Smith et al., 1994; Wiersema y Bantel, 1993) - Sales Growth (Eisenhardt y Schoonhoven, 1990; Murray, 1989; Simons, 1995; Smith et al., 1994) - Global return (Haleblian y Finkelstein, 1993; Murray, 1989) - Return change (Simons, 1995)		

3. Methodology for assessing team effectiveness

The methodological problems of assessing team effectiveness at a team level of analysis are: to gather data and process to obtain the final value of team effectiveness. Both of them depend on the variables and types of measures used. In this sense, only performance effectiveness and behavioral outcomes can be rated with objective measures. Studies using these dimensions and measures have usually gathered data of firm records and files. Nevertheless, these objective indicators have problems. The first is that not all firms have data about these team indicators. The second is that, although firms had these data, it is difficult to make comparisons because of the different characteristics of teams, in terms of assigned tasks and composition (Campion et al., 1993).

Because of these problems, in the majority of the cases, team studies use subjective measures (Kirkman et al., 2001) and the survey as the instrument to gather data. Specifically, two different methods that have been used for measuring team-level data are based on assessing individual team members' perceptions. In the first method, team members respond to items asking about individual-level phenomena, and these responses are aggregated to the team level (Tesluk et al., 1997). Authors generally use the aggregation procedure of Rousseau (1985) that consists of: 1) being sure that there are similar responses within the same team and 2) computing team magnitude averaging individual responses. This approach has been criticized, however, because aggregating items that assess individual perceptions of confidence in one's own ability may not, in many cases, capture the team's collective sense of its ability to successfully accomplish team task. On the other hand, these measures have problems, such as overrating (Lean et al, 2007).

In the second method, survey items are written to capture not individual attributes but attributes of the team as a whole. Thus, the referent used in each survey item changes from the individual to the team (e.g., Earley, 1999; Feltz and Lirgg, 1998). However, the level of measurement still resides at the individual, not the team level of analysis. Moreover, the use of the survey as an instrument to gather data has another problems. Perhaps, the most important at the team-level of analysis is the response rate.

If response rate is low, obtained effectiveness magnitude is not reliable. For increasing this rate it is necessary for researchers to access firm and to their teams.

Because of the problems in items definition and answers aggregation, a third method for measuring team-level data is proposed, the consensus method (or team discussion) (Earley, 1999; Gibson, 1999; Gist, 1987). This involves having the entire team meet together and collectively respond to survey items about a team level construct using consensus decision making. From the researcher's perspective, the team consensus methodology is quite labor intensive. Moreover, there is very little evidence to date demonstrating the superiority of the consensus method compared to aggregation. Nevertheless, Kirkman et al. (2001) compared the three methods and concluded that consensus is often superior to best members performance. However, the consensus method also has limitations. The disadvantages include all of the widely recognized potential limitations of team decision making such as: teamthink, popularization, status differentiation, conformity, domination of discussion by one or two members, or the increased time needed to reach consensus.

Due to the problems in each method, Kirkman et al. (2001) recommend using multiple methods: aggregation methods, consensus approach, as well as others as key informant or observation.

4. Conclusions

The increasing use of teams to answer to the requirements of environment flexibility has woken a great interest among academics and professionals. Many studies have been done in the last decades (for example, Campion et al., 1993; Sothsayer et al., 1996; Gladstein, 1984; Kirkman et al., 2001). Teams play a fundamental role in the organizational success in a global, changeable and client-oriented economy (Mathieu et al., 2006).

Specifically, the most analyzed question is team effectiveness. The ambiguity around the term has hindered his study and, besides, the majority of the investigation has focused on identifying effectiveness factors, instead of the dimensions and the variables. Moreover, an added problem is that teams analyzed in different studies are different -work teams, parallel

teams, project teams, management teams-. Additionally, team procedures of measurement have not been studied enough (as exception, see the work of Kirkman et al., 2001).

Due to these delimiting and evaluation problems in team effectiveness, in this work we have tried to review the literature to identify dimensions, variables and measures. Also, we have analyzed the procedures used to measure team effectiveness.

Several conclusions have been obtained of research review. Firstly, the multidimensional character of the construct. This means that several dimensions categorize its construct space. Specifically, we have identified three dimensions: performance effectiveness, attitudinal outcomes and behavioral outcomes. The importance of each one will depend on particular values and activities of the teams. Previous research shows that behavioral outcomes are not significant for assessing effectiveness in parallel and project teams, but are important in work teams, self-managing teams and relatively significant in management teams. Objective and subjective measures are used. Although attitudinal outcomes are rated in all teams, their role is more important in self-managing teams, being satisfaction the most used variable. Attitudinal outcomes are subjectively measured. Objective and subjective measures are also used for assessing performance effectiveness. However, the use of objective measures is limited to traditional work teams and management teams.

Secondly, using several data sources to remove assessment errors would be advisable. All the team members, including external people, would assess the team effectiveness. Anyway, companies would also develop objective measures to assess team effectiveness, although this is not possible for attitudinal outcomes.

Finally, as using multiple data sources, different methods for assessing effectiveness would be combined (aggregation, consensus, and other methods as observation and key informants).

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