



Self-managed teams in the auto components industry

Construction of a theoretical model

Celso Luis Alves Pais
Oporto, Portugal

Self-managed
teams in the auto
industry

359

Received June 2009
Revised March 2010
Accepted March 2010

Abstract

Purpose – The overall purpose of this paper is to explain theoretically the autonomy phenomenon of teams working within the auto manufacturing context and its implications for the technical and social aspects of group work.

Design/methodology/approach – Three auto component companies were studied. The procedures of a qualitative methodology were followed, adopting naturalistic observation techniques of work teams, and unstructured and semi-structured interviews conducted with operators, supervisors and middle managers. To analyse and interpret the qualitative data obtained, the grounded theory technique was used.

Findings – In this paper 33 concepts were obtained, which resulted from the constant comparative method applied to data. The relationships between those concepts allowed the construction of a theoretical model that is settled in the “bridge” concept. This “bridge” is a metaphor that translates the process which binds operational work group goals to the needs of external clients. This process is supported by social aspects – team decision making, participation, mutual helpfulness, and social and emotional relationships, and by technical aspects – operations and information. The bridge has four pillars that are critical to the effective functioning of self-directed teams: team facilitation, hierarchical relationships established within the teams, quality of manufactured components, and productivity achieved.

Research limitations/implications – The present investigation was carried out in a specific industry, which does not allow for the generalization of the model to other industries. Furthermore, it may be questioned whether the same results be obtained if the operators of the teams observed were interviewed, not individually, but in a group situation. Other kinds of research design and other industries organized on the basis of autonomous work groups must be studied, applying the grounded theory technique, in order to compare diverse theoretical models.

Practical implications – The organization of the industrial automotive production based on self-directed teams, which know the needs of external customers and to whom a high level of participation in operational decisions was given, can generate a substantial increase of working groups’ efficiency and an increase in job satisfaction.

Originality/value – The study of teams in the automotive components industry – in a southern country of Europe – and the consequent elaboration of a specific theoretical model draws attention to the need for social research that takes into account the fact that realities are constructed by the actors who interact in a certain context. No theoretical model can ever encompass the reality of all contexts.

Keywords Team working, Leadership, Group theory, Organizations, Automotive components industry

Paper type Research paper



The author would like to thank the human resource managers of the three manufacturing companies that were studied for their kind gestures and their supply of data concerning organizational structure and functioning.

Introduction

The present research focuses on the autonomy of manufacturing work groups. The central characteristic of the autonomous work groups is the existence of a high degree of employees' self-determination on the management of daily tasks (Wall *et al.*, 1986).

Individual task autonomy has been linked to the increase of work motivation, professional satisfaction, and good performance (Hackman and Oldham, 1975; Karasek, 1979; Warr, 1994). On its turn, team autonomy has been connected to an increase of productivity, quality of performance, innovation, professional satisfaction, and a decrease of turnover and labour accidents (Goodman *et al.*, 1988; Guzzo and Dickson, 1996; Hackman, 1987; Sundstrom *et al.*, 1990).

The autonomy of work groups is closely related to the question of hierarchy in organizations. For Jaques (1992), the reason why organizations have a hierarchical structure does not only stem from the fact that tasks have their processing in higher or lower levels of complexity, but also from the fact that there are clear discontinuities that separate the tasks by categories. However, Jaques (1992) points out that something has been failing in the chain of command of organizations, such as, for instance, the excessive number of degrees in the hierarchical scale. The information goes through many people, and managers and their subordinates are too close, if their skills and experience are being considered. Therefore, this situation generates the asphyxia of leadership, the decrease of responsibility, and the creation of a climate characterized by mutual guilt.

Self-managed work teams assume a change on this kind of climate and constitute another organizational structure, whose goals are fixed on the increase of organizational effectiveness (Rafferty and Tapsell, 2001). Cohen and Ledford (1994) assert that substantial benefits have been found through the implementation of autonomous teams in several workplaces, such as higher levels of group productivity, improvement of product quality, improvement of customers' satisfaction, and better work safety.

During the twentieth century, a great deal of research had been done about work groups. In the fifties, the sociotechnical systems theory appears, as a result of the studies made by the investigators of Tavistock Institute in the coalmines of Durham in the UK (Trist and Bamforth, 1951; Trist *et al.*, 1963). These studies describe and analyse the relationships between physical-economical-technological components of the mines and the social-psychological components of the work groups.

The theoretical and empirical corpus produced by sociotechnical systems tries to improve productivity and human enrichment, by designing processes that have their focus on the interdependences between people, technology and environment. In the perspective of Guzzo and Shea (1992), the sociotechnical theory's appeal comes from its conception of Man, that is seen as a being that tries the hardest, with development and learning capacities, and endowed with a democratic sense. According to the words of the cited authors, "future maker". Nonetheless, since the 1960s, most of the research made about small groups suffered the influence of social cognition, a dominant paradigm at that time.

For Arrow *et al.* (2000), the schools that were first involved in the study of groups were respectively:

- influence systems to the group members (e.g. Lewin *et al.*, 1939);
- systems for interaction patterns (e.g. Bales, 1950);

-
- systems for task performance (e.g. Hackman and Morris, 1975; Steiner, 1972);
 - contexts by which individuals develop their self-knowledge (e.g. Tuckman, 2001); and
 - sociotechnical systems with various results, such as task performance and individual satisfaction (e.g. Trist and Bamforth, 1951).

Item 5 has connections with the choice of the subject of the present investigation, i.e. the study of autonomous teams in a manufacturing environment. This theme appears within the context of a previous investigation, by which we studied the representations of effective leadership in some companies operating in the northern region of Portugal (Pais, 2003). The results found led us to conclude that the democratic style of leadership was perceived by the subordinates as the one that best permit the work group leader to achieve goals with successfully. In that investigation, we meant to know the subordinates' opinions about the best way their leader could behave, in order to reach pre-established targets (Yukl, 1989).

According to McClelland and Burnham (2003), the democratic style foments the appearance of workers' suggestions and involves them in the solutions implemented[1].

The formation of autonomous teams in organizations would be, therefore, a type of workplace democracy, preventing the alienation of workers and giving a real meaning to the work life. On these terms, the group's dimension drew our attention. Thereby, the main goal of our investigation is the theoretical explanation of the team's autonomy phenomenon, within a manufacturing environment, and its implications on technical and social scopes.

Referring to Peters and Waterman (1982), small groups are the basic parts that build excellent firms. According to Ilgen *et al.* (2005), the arguments for the institution of organizational team-based structures are frequently assured by the belief that group members can enlarge the base of initial collective knowledge and they contribute towards the extent of this knowledge, as a consequence of their mutual learning[2].

Adopting a pragmatic attitude, McIntyre and Salas (1995) consider that one of the most important reasons for the implementation of team designs is related to the necessity of sharing the workload. And, at this point, we think that is pertinent to distinguish between conventional and autonomous teams. Orsburn *et al.* (1990) characterize conventional teams as having many functional categories, with a supervisor controlling daily activities and holding a reward system linked to individual performance and tenure. Yeatts and Hyten (1988), on their turn, define a self-managed work team as "a group of employees who are responsible for managing and performing technical tasks, in a product or service being delivered to an internal or external customer" (p. xiii).

For Metlay *et al.* (1994), a self-managed team is a distinct kind of work group with decision-making power, habitually assigned to the manager of the group.

Varney (1994) goes even further and defines a self-managed team as "a group of people performing similar work, who have the responsibility, authority and accountability for planning, organizing, managing, controlling and measuring their work" (p. 111). In other words, autonomous teams perform complete tasks, encourage diverse contributions based on specific skills, have power to decide over the work

methods and over the time needed for task accomplishment, and receive feedback and rewards within a group philosophy (Polley and Van Dyne, 1994).

In the context of teams, Molleman (2000) considers that autonomy has to do with the freedom to make decisions on goals ("what"), on work methods ("how"), on planning matters ("when"), and on task assignment. For example, matrix structures and empowerment[3] philosophy have been generating an increased drive on the workers' participation in the decision-making process, in order to improve productivity and diminish production costs. Lean Production is an example of those objectives, and it has been implemented in most factories of automotive components industry (Delbridge *et al.*, 2000; Niepce and Molleman, 1998; Rafferty and Tapsell, 2001; Spear, 2004).

The implementation of self-managed work teams in this industry wants to achieve economical and social dimensions of group effectiveness, as referred by Savoie and Beaudin (1995). The teams we have studied in three industrial organizations have some autonomy features that may be found on the aforementioned definitions of self-managed work groups. But we did not find a full degree of autonomy in those teams, since they must report hierarchically to Supervisors or Line Leaders. Nevertheless, the mission of these line managers is to provide information and other resources for goal accomplishment. They did not exert a traditional leadership style, based on authority and command. Line managers, in this environment, need to be aware of emotional intelligence skills, to improve team performance (Polychroniou, 2009).

Theoretical models of self-managed work teams

We mentioned five theoretical models, which are related to the study of autonomy in work groups. All of them are related to a vision of human resource management, which, according to Lundy (1994), is called Commitment-based HRM. This perspective suggests that managers at various levels of the decision process should encourage a set of attitudes that leads to: job enlargement; combination of planning and implementation; flat structure of teams; shared goals for coordination and control; status minimized; reinforcing group achievements; pay geared to skill and other contribution criteria; profit sharing; mutual mechanisms for communications and participation; mechanisms for giving employee voice on issues; mutuality; joint problem-solving and planning; fulfilment of employee's needs.

The first model we describe here is the sociotechnical theory, which appears in the early fifties as a result of several studies carried through by the London Tavistock Institute, namely in the context of coal mining (Trist and Bamforth, 1951). According to Guzzo and Shea (1992), the sociotechnical theory gave us a counterpoint to the mechanistic theories of the organization and management, such as Weber's bureaucratic theory and Taylor's scientific management theory.

The sociotechnical theory perceives the organization as an entity that is constituted by two different but interdependent systems: the technical system that includes the equipment and technological processes and the social system, which includes affective webs (Ketchum and Trist, 1992). The first system follows the rules of physics, chemistry and engineering. It is concerned with the transformation of raw materials into useful products. This is the system that links operators to the technology itself. The second is about human relations and follows the canons of psychology, sociology and politics. In the opinion of Ketchum and Trist (1992), the demands of these two

systems are, frequently, in conflict. The traditional workplace respects technological imperatives. Therefore, people are expected to adapt their behaviour to technology. The result is generally the occurrence of a disharmony between work characteristics and people characteristics.

The sociotechnical approach denies the postulate which asserts that people must be adapted to technology; it also assumes that there are different ways to use technology, and that a technical system may be adjusted to people's needs. The harmonization between technical and social systems constitute a process called *joint optimization* (Ketchum and Trist, 1992; Seers, 1996). This optimization is the basis to implement self-managed work teams, according to the principles that guide the sociotechnical model (e.g. operations' responsibilities centred on the team; participation (Cherns, 1993)).

Another important approach to the theory of self-managed teams comes from Hackman and Oldham (1980). These authors differentiate two kinds of groups: co-action groups (where people are under the same supervisor) and self-managed groups, which have the following attributes:

- *They are real groups*, i.e. they are an identifiable social system in which members have interdependent and mutual relations and develop different roles throughout the time.
- *They are work groups*. The group must have a defined component of work, which results in measurable products, services, or decisions.
- *They are self-managed*. Group members must be given the authority to manage their own tasks, and their interpersonal processes, as the work is carried through.

For Hackman and Oldham, the motivational structure of autonomous group tasks affects the effort invested by group members in their work. If individuals within the group are to experience a high degree of motivation, the following conditions must be satisfied:

- the group task must request different skills (variety of skills);
- the group task must constitute a complete component of work (task identity);
- the results of group task are different in comparison to other people in the organization (task significance);
- the group's task gives individuals a substantial latitude for decision-making, about how to carry out the work, including work methods, management of priorities, work pace of work, etc. (autonomy); and
- the whole group receives reliable information about its work and about its performance (feedback).

We think that, unfortunately, the perpetuation of repetitive mass production methods stop workers from getting a real satisfaction about their job, due to the type of task they perform.

The third theoretical point of view on self-managed teams has its origin in Pearce and Ravlin (1987). The authors define an autonomous work group as one that controls the assignment of individuals to perform various roles and whose task constitutes a complete piece of work, involving multiple skills. Pearce and Ravlin (1987) have

developed a theoretical model, which exposes the prerequisites, regarding the design and activation, the process criteria, and the evaluation criteria underlying to the successful implementation and operation of autonomous groups.

For instance, in what concerns the design and activation of these kinds of work groups, the authors point out the following conditions: active management support, training in decision skills, incentives for old norm violation, and knowledge of group developmental stages.

We now introduce the fourth theoretical perspective on group autonomy: The model of Tubbs (1994), to who autonomous work teams rely on the contribution of several disciplines, such as psychology, organizational development, communication theory, open systems theory, group dynamics, and total quality management.

Drawing on the systemic approach, Tubbs has conceived a model for self-managed work teams that inserts four types of variables: external cause variables (global market and economy, legal and political, socio-cultural values, and individual characteristics); internal cause variables (organizational structure, organizational climate and culture, leadership, technological aspects); group process variables (physical environment, group size and structure, status and power, group norms, communication, roles, decision-making, conflict, motivation); and result variables (individual satisfaction, solutions, interpersonal relations, risk-taking, absenteeism, turnover, grievances, product and service quality, productivity, profit). The author reminds us that this model recognizes that all the elements of the system depicted are simultaneously interacting with one another and all interrelated, i.e. any change in one part of the system affects the other parts of it. In our view, there is a clear predominance of the open systems theory.

Finally we refer to the model of Metlay *et al.* (1994). This model, as the previous one, considers the work group as an open system that obeys to a four-staged cycle: inputs, process, outputs, and feedback.

The first stage includes variables linked to social factors, technology and physical setting. The second refers to all the activities and behaviours that occur as time goes by. All the results and consequences obtained from the inputs and processes constitute the output stage (the third stage). At the fourth stage, Metlay *et al.* (1994) expose a fourfold feedback: task feedback (concerning every information related to quantity, quality and accomplishment of deadlines); individual feedback (information received by a group member about his behaviour and his performance); group feedback (the information about how the group solved its problems); and environmental feedback (the answers that the organization gives to the group's suggestions, and the information that comes from internal and external customers). The model of Metlay *et al.* (1994) seems less abstract than the Tubbs' model. For example, the variable feedback appears very well operationalized.

Method

The main objective of this investigation is to theoretically explain the phenomenon of the autonomy given to work teams operating in the manufacturing context of the auto components industry. This goal, in our opinion, seems incompatible with a positivist methodology, i.e. we cannot alienate ourselves from the setting where the investigation occurs.

For Guba and Lincoln (1994), human behaviour, contrary to physical objects, cannot be understood without being related to the meanings and intentions that human beings

have on their activities. On the other hand, according to the previously mentioned authors, all findings would be generated through the interaction between investigator and phenomenon. Such findings appear to be, in our opinion, inventions of the human mind, subjected to errors. On this subject, Anzieu (1984) states that objectiveness, in social research, is a technical illusion. Thus, our empirical approach will follow the premise that assumes group members as interacting individuals within a given context. This kind of interactions generates changes on teams and their environments differently from cause-effect perspectives (Ilgen *et al.*, 2005). Bearing this in mind, we have opted for qualitative methodologies, drawing from a multiple case study (Yin, 1994), which treats three plants of automotive components, each of which pertaining to a different company. All of these plants have implemented autonomous work teams. Therefore, in Yin's (1994) words, the aim of a multiple case-study is to try to describe the same phenomenon – in our research, the autonomy of groups.

Eisenhardt (1989) and Yin (1994) consider that case studies must start by enunciating the questions underlying to the investigation. In our multiple case studies, the following questions were formulated:

- (1) How do the plant operators and their hierarchical superiors experience the autonomy given to work groups?
- (2) After working in an autonomous regime, what is the perception of the actors on the issues linked to productivity and quality goals?
- (3) What are the implications of group functioning at technical and social levels?
- (4) What modifications were suffered by the relationships between group members, after the implementation of autonomous teams?
- (5) Is good team performance perceived as something related to the existence of a formal team leader?

Following the canons of qualitative methodology, information was gathered on the three companies, by adopting the naturalistic observation technique (observation of work teams during the work period), and non-structured interviews were also performed (Alonso, 1995; Mucchielli, 1991), talking informally with the operators while they were working. Then, individualized semi-structured interviews were conducted (Fontana and Frey, 1994) with operators, their supervisors and their middle managers. Finally, some documents were analysed (e.g. newsletters, operational processes, organic structures).

A written confidentiality agreement was signed with the three companies in study, stating a non-disclosure commitment towards the anonymity of both company and workers.

The information collected was subsequently treated using the Grounded Theory technique (Charmaz, 2006; Glaser, 1978; Strauss and Corbin, 1998). Categories were given a code, which is the process of defining data. Units of information – paragraphs and phrases taken during interviews and field observations – were coded in order to obtain, first, descriptive categories. Then, the descriptive categories (first level) were grouped into categories of second level. This involved the process of abstracting common themes that emerged from the data.

We observed nine operational teams (three per company), during the full extent of the workday. Teams carried out technical tasks, administrative tasks and group tasks.

Regarding technical tasks, operators produced components, performing repetitive task (the context being mass production). But they were also involved in the first level of machine maintenance and they are given the responsibility of setting the machines needed to produce new components.

Administrative tasks include filling productivity and quality reports, and also charting these management indicators. Finally, group tasks give operators a chance to participate in meetings, either to plan the distribution of personnel for the workday, or to discuss, as a group, best solutions to fix small breakdowns. Group tasks also include team meetings, whose purpose is to brainstorm ideas to deal with productivity and quality problems. Some of these meetings are attended by supervisors. They frequently assume a passive attitude, with no direct intervention on the discussions. They only give, whenever necessary, the information (e.g. customers' claims) teams need to resolve the issues. Twice a week, in company 3, one of the team members attends a meeting with supervisors and middle managers (production manager, engineering manager, maintenance manager, quality manager, and human resources manager) during which he provides his views on production and quality issues.

During observations, some unstructured interviews were conducted, which happened in the form of a casual conversation while the workers were operating their machines. The resulting data was written on a notepad.

Furthermore, in order to answer the questions raised during this investigation, we ran twelve semi-structured interviews (four per company). In each company, two blue collar workers and two white collar workers of different hierarchical levels were interviewed (supervisors and middle-managers). Each interview lasted about half an hour, and all the interviewees were informed about the confidentiality and anonymity of their statements. Interviews were conducted in a private room, and the answers were recorded.

The Appendix presents the transcript of the semi-structured interview.

Cases

As we have previously stated, the present investigation is related to the auto components Industry. We have studied three multinational companies that produce respectively: steel cables, covers for passenger seats, and electric power assisted steering rotors. We have chosen these companies because they had implemented work design structures based on self-managed operational teams.

The plants where the data were gathered are located in northern Portugal. Table I characterizes work teams and their co-ordination modality, in all the three cases. Companies 1 and 2 operate on a three shifts scheme (6 a.m.-2 p.m.; 2 p.m.-10 p.m.;

Cases	Product	Implementation year of autonomous teams	Number of autonomous teams	Co-ordination modality		
				Rotational leadership	Permanent leadership	Facilitation
1	Steel cables	2005	54	×		
2	Covers for passenger seats	2003	56		×	
3	Electric power assisted steering rotors	2005	9			×

Table I.
Characterization of cases

10 p.m.-6 a.m.). Company 3 works only with two shifts (6 a.m.-2 p.m.; 2 p.m.-10 p.m.). Operators are assigned fixed shifts, in all companies.

A total of 571 employees work in company 1 (case 1), 456 of which are directly linked to the production process. This process follows five steps: wire lamination, cable cutting, wire covering extrusion, injection of metal at the cable's, and cable assembling.

In 2005, self-managed teams were introduced, for the first time, in one of the cable assembling lines. In these teams, leadership and other team roles were rotational.

Teams we observed in case 1 had, respectively, three, ten, and seven members (all workers were women). The differences in the teams' composition are due to the type of cables being produced. In all teams, the operators work side-by-side, performing the same task over eight hours shifts. Some exceptions to this rule may occur when the team is lacking one of its members. The setting up of new components requires the participation of all team elements. In this situation, specific parts of the machine are replaced.

Hierarchically, work teams have a supervisor, who leads several work groups in the same operational area of the production process. Production areas are headed by middle managers.

Case 2 – a plant that manufactures covers for passenger seats – had 310 employees directly linked to the production process, which is structured into three production units (one of cutting, and two of sewing). In this plant, each autonomous work group has a fixed team leader, and each group reports to a supervisor, who co-ordinates several work groups. A supervisor is oriented by a middle manager, who is responsible for a production unit. All groups are made up of female workers.

Teams working in the cutting units have nine members. We observed one of these teams and we identified various subsections, with specific tasks (e.g. pressing, selection of cutting boards). There is some turnover between the operators of those subsections, during the workday.

Teams working on the sewing department have a variable composition, depending on the type of cover is being produced. Two teams were observed, one of them with six members, and the other with three operators. Workers in these teams operate almost always the same sewing machine, performing a very repetitive task. Some tasks (e.g. sewing strips) require special training, and not all operators are able to do this kind of work.

The machines are shut down whenever a problem regarding quality occurs. Immediately, operators meet with the supervisor in order to jointly find the best solutions to the problem they are dealing with. Everyone has the opportunity to manifest their opinions and to give their contributions. We had the opportunity to sit during one of these meetings, which occurred due to a problem with the length of the sewing strips.

Finally, case 3 has 130 employees, 79 of which directly implicated in production operations. The manufacturing process involves four phases/sections: stacking, stator assembling, rotor building, and final assembling. Here, work groups have both male and female workers.

We observed one work team working on stacking and stator assembling. It was composed of eleven members. Here, workers frequently swap between tasks during the workday. Thus, the company promotes versatility and avoids work-related diseases, normally associated with the machine operators' hand and arm joints. We asked the

operators' opinions on that operational process. They said that they agreed with the scheme implemented. One operator said: "I think it's better to change machines, because everyone has to know how to work with all of them, not only the physical strength that some jobs demand, but also because everyone is supposed to be versatile in this company".

Two other teams were observed in this company, both operating on the rotor building section, but on different shifts (6 a.m.-2 p.m. and 2 p.m.-10 p.m. respectively). Each team has six members. This section has four robotic winding machines, controlled by one member of the team. Four workers operate machines for cutting, tinning, moulding, and adjustment of wires. The sixth operator supplies raw materials to the section with. The moulding machine, is usually operated by men, because it requires more physical strength.

In terms of hierarchical structure, this company's work groups have a particularity: the existence of a team facilitator that is one of the group's members, who plays no leadership role on their team mates. This is a rotational role, which endures for two months. One of the tasks performed by the team facilitator is bringing information to the team.

Each self-directed team is supervised by a line leader that reports to the production manager. The line leader must perform a coaching role giving teams constant information and helping them achieve problem-solving tasks.

In the three cases described, the autonomous production group is the unit being analysed. In order to answer some of the questions formulated in this investigation, it was our intention to observe work teams that had achieved good productivity and quality levels. For this purpose production managers, in each factory, indicated three high performance teams with, in terms of productivity and quality.

Data interpretation

Strauss and Corbin (1998) consider that phenomena are represented according to categories. The information we have collected (through naturalistic observations and interviews) was therefore analysed, in order to formulate descriptive categories (first level categories) obtained from data units. Thus, we have echoed the grounded theory technique (Glaser and Strauss, 1967).

Descriptive categories were then attributed to another level of abstraction – second level categories. In this process, Charmaz (2000) says that after deciding which categories best explain what is happening in a study, the researcher must treat them as concepts. It was precisely what was performed in this study, when the second level of abstraction was reached. To carry out the organization of categories and data questioning, the N VIVO 7 QSR International was used, a software program that treats qualitative information.

Parry (1998) asserts the existence of some similarities between the grounded theory analysis and the research resulting from case studies. The author affirms the existence of those similarities in the process that begins with the pure description of substantial contexts and progresses by means of theoretical coding, reaching a more complex explanation of the phenomenon.

After the elaboration of a higher abstraction coding, 33-second level categories were obtained. These categories are defined in Table II.

Second level category	Definition
Learning	Operators' acquisition of fresh knowledge and fresh skills
External customers	It refers to customers' needs and the goals they set to the company's production
Group composition	It has to do with fixed or variable constitution of the work group and with the issues posed by that dichotomy
Communication	It involves every manifestation of dialogue between team operators, in team meetings or during machines' operation
Performance	The way tasks are executed by team operators in terms of work pace
Group development	Acquired progress of work groups both at operational and socio-affective levels
Discipline	Rigorous fulfilment of prescribed rules by operators
Mutual helpfulness	Attitudes and behaviours that express or not the existence of a helping climate between team mates
Effort	Expenditure of increased energy in over work situations
Facilitation	This category concerns, specifically, to case 3, where teams have no leader. They have a facilitator. This one is a group member who must give information to the team. This information is obtained through the constant interaction with the line leader. Facilitator also guarantees the means for group's good functioning
Model groups	Groups that execute their work according strict performing norms. This kind of group exhibits a pattern of excellent work Only case 2 has model groups
Information	Diverse data transmitted to the work groups. Data came from teams' hierarchical structures, in order to improve group functioning and lead the groups to achieve goals more easily
Team leadership	A set of responsibilities that are inherent to the team leader's role. This position exists only in teams of cases 1 and 2. In case 3, there is a facilitator role
Physical environment	It concerns the physical areas where teams carry out their work, and also to the environmental conditions of that areas
Motivation	Behaviour's orientation of the operators to team goals' fulfilment, or to individual needs. It includes feelings of frustration when team goals are not achieved or individual needs are not fulfilled
Group goals	Pre-established quantitative targets, which concern to work productivity, to products' quality, and to any other aims of group performance
Operations	It includes aspects related to tasks, equipments, and raw materials, involved in group-works
Participation	Operators' behaviour that shows the presence of a contributive attitude to decision-making processes in the work team
Team decision making	Team's discretion to decide in matters that concern to group composition, productivity, product quality, or to any other issue concerning team's functioning
Multi-competences	It is the team members' capability to carry out some of the tasks that usually are performed by staff personnel (e.g. quality control, equipment maintenance)
Task enlargement	Operators' skills which permits them work in different machines, in distinct moments. It also concerns the fulfilment of diverse registers related to machine operations (e.g. productivity reports)
Productivity	Number of pieces produced per time unit and per operator or per team (continued)

Table II.
Theoretical definition of
second level categories

Second level category	Definition
Quality	This category involves team-control and self-control of errors during production process. It also involves correction strategies adopted by work groups in order to deal with standard processes' deviation
Rewards	Pecuniary or symbolic prizes attributed to team's achievement of pre-established goals
Space relations	Manufacturing equipment and operators lay-out in cells or production lines
Hierarchical relationships	Operational relationships established between supervisors (or middle-managers) and team members
Social and affective relationships	Social and affective connectedness between operators, or between these, and their superordinates. This relationships can insert conflict situations
Accountability	Increase of operators' responsibility which is related to task enlargement
Role rotation	Alternate role performing within the work team
Cohesiveness	Attitudes and behaviours that promote mutual attraction between team members
Competition	It concerns phenomena of emulation between team members, or between work teams
Individual needs	Expression of individual objectives (which may or not evidence selfishness) within work team
Change	This category expresses the alteration of operators' attitudes, and also the alteration of manufacturing process's rules

Table II.

For example, the second level category “external customers” resulted from the process of abstraction on a set of first level categories, namely: “achieve the objectives assigned by the customers”; “customers’ needs”; “team relationships with external customers”. Second level category “group goals” derived from a set of first level categories, including, e.g. “meet the objectives of the team”; “commitment of operators in achieving goals”; “daily targets”; “organize towards objective achievement”; “feeling bad for not achieving objectives”.

Categories shown in Table II resulted from a process of interpretative confrontation with an independent investigator who codified, randomly, about 25 per cent of data collected (extracted from the three teams observed and from the three interviews). In this process of confrontation we followed the suggestions of Butterfield *et al.* (2005).

Theoretical model

Now we expose the conceptual relations we established between second level categories, according to the leads suggested by Dey (1993), which regard the connection between data bits (formed at the basis of first level categories).

The process of second level categories’ connection is exemplified in the excerpt that is mentioned on Table III. This is an interview with an operator working for company 3.

A graphical representation of these connections is presented on Figure 1.

After the elaboration of all connections between second level categories (involving both unstructured and semi-structured interviews, and the data obtained from field observations), we were led to a bridge metaphor. This bridge links two main categories

First unit of analysis (descriptive category)	Second level category	Second unit of analysis (descriptive category)	Second level category
We made some proposals towards change, but sometimes they could not be implemented ... (non-implemented proposals)	Participation	... sometimes, supervisors forget to give us some explanations about the reasons why our proposals haven't been implemented (operators aren't informed)	Information
"... there were many things we had to improve, during self-managed teams' implementation: reporting, graphics, and so on ..." (self-managed teams' progress)	Group development	"... because operators helped each other and I think that, after all, I am the person I am today, because I help my team mates, even when the line leader is absent" (there is helpfulness in the team)	Mutual helpfulness
"Before the implementation of self-managed teams we had to call the maintenance technician to deal with machine breakdowns" (period previous to self-managed team's implementation)	Team decision-making	"Now, people are accountable for that." (operators' accountable attitude)	
Accountability "Within the team, we assign the administrative tasks between ourselves." (sharing administrative tasks)	Multi-competences	"The facilitator is not the central person in the team. He has his job, but the whole team is always asked to intervene. Otherwise, the team members could not help each other" (there is helpfulness in the team)	Mutual helpfulness
"The team is already autonomous to make any decision, when it is necessary ..." (self-managed teams' progress)	Group development	"Even without a facilitator, the team can make any decision ..." (team without facilitator)	Facilitation

Table III.
Examples of links
between descriptive (first
level) categories
(extracted from an
operator's interview –
company 3)

in our model: Group Goals and External Customers. Table IV shows some data bits that express this kind of connection. In this model, only the categories with great empirical scope are represented. The categories with great empirical scope are those that resulted from the aggregation of a large number of categories of first level (Dey, 1993).

This bridge has four columns, which represent, respectively, team leadership, hierarchical relations between teams and their superordinates, quality of products, and manufacturing productivity. These columns have their support on four piles.

Figures 2 and 3 exhibit our autonomy model, respectively, for teams with formal leadership (cases 1 and 2) and without formal leadership (case 3).

The first column (team leadership) is only concerned with cases 1 and 2, and integrates two categories: role rotation, and learning. Some excerpts taken from interviews illustrate these connections to the column of team leadership.

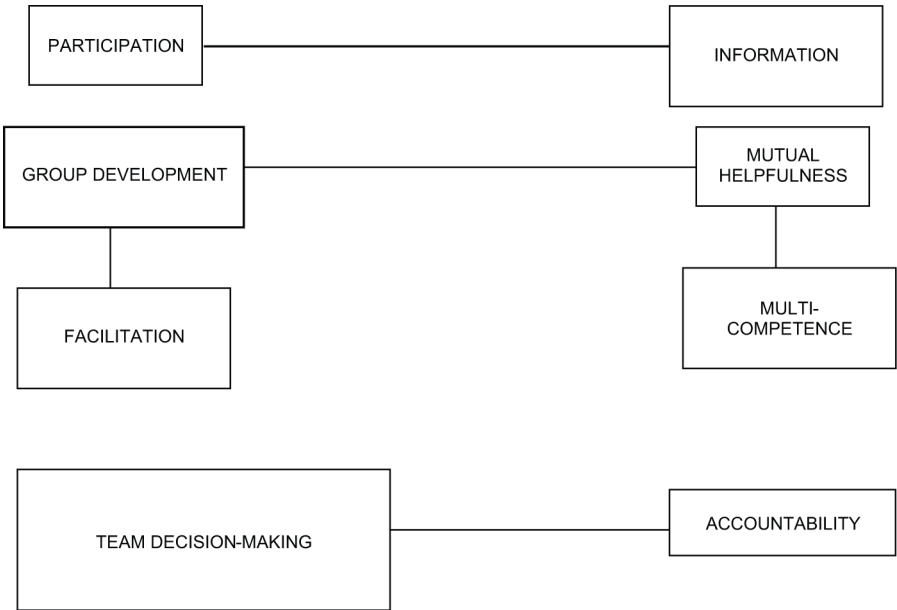


Figure 1.
Connections between
second level categories
(operator’s
semi-structured interview
at company 3)

Data bits

<i>Observed team</i>	
Team of company 1	“ ... Task time, which has to do with the cycle, teams must achieve certain goals, in function of the time and economical requirements set by customers”
<i>Interview</i>	
Interviewee of company 1	“Every week a program runs customers’ orders”
Interviewee of company 2	“Changes only occur when customers change the content of their orders” “And every week, we have the production plan, in which some alterations in the customers’ orders may occur”
Interviewee of company 3	“We must plan our production goals bearing in mind the customers’ needs.” “Our goals cannot be set by group members, because they do not know what the customers’ needs are” “My boss gives me the goals. My boss is more connected with the sales department, and when he receives the goals – he receives them for three or four months – he gives me the goals, to satisfy customers’ needs, in order to prevent any problem regarding those orders”

Table IV.
Examples of data bits of
team observation and
interviews that express
the bridge between group
goals and customers’
needs

Interview with a supervisor at company 1:

“We have teams where the job of team leader is rotational, who attend the meeting with middle managers” (role rotation); “but there are teams where the team leader is a permanent position. That member is the operator who sees the missing materials” (team leadership).

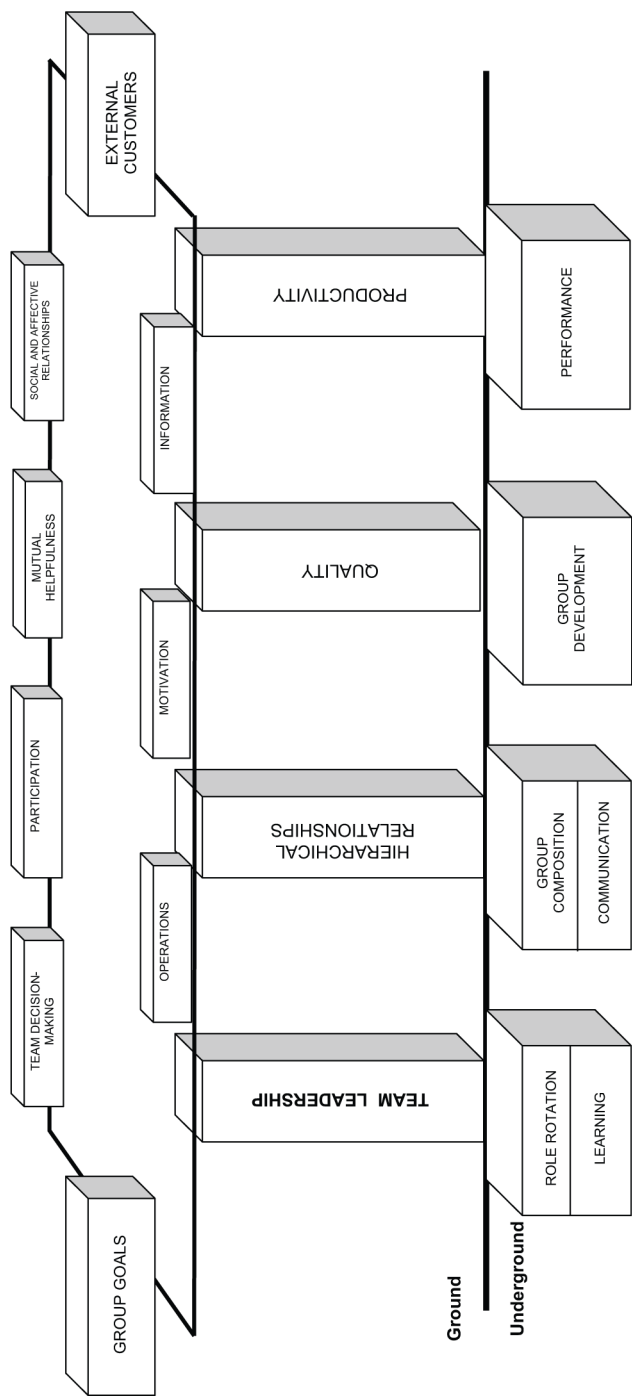


Figure 2.
Model of autonomous
work teams with formal
leadership

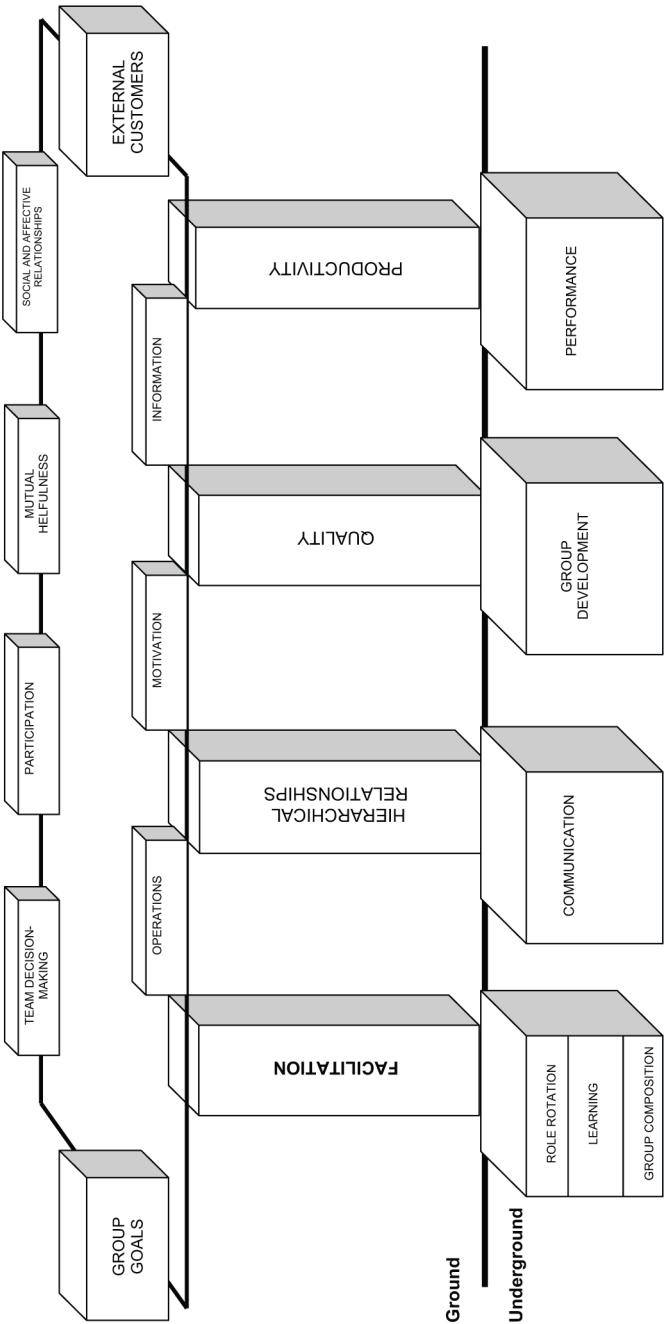


Figure 3.
Model of autonomous
work teams without
formal leadership

From observations at company 1:

There are people who refuse to learn [learning]; Therefore, one must expect a significant amount of employees who do not want to play the role of team leader [team leadership].

In case 3, the column team leadership is called facilitation, and it contains one more category: group composition (the constitution of work groups is the responsibility of team members, not a supervisor prerogative).

In cases 1 and 2, the second column (hierarchical relationships) has two categories: group composition (here supervisors have the authority to assign membership of work groups) and communication (this is the only category that appears in the pile of case 3).

We can exemplify this kind of conceptual connections, from the following excerpts: Interview with a middle manager at company 2:

There was a need to change some people in the team [group composition]; The supervisor had to make that decision [hierarchical relationships].

Interview with an operator at company 2: "Sometimes, when the work goes well, we tell some jokes to cheer" (communication); "But if the supervisor is with our team, or other manager, we become more shy" (hierarchical relationships). We can see that, in this company, the existence of a certain degree of formality in the relationships maintained with the superiors. This is a company in which the logic of team autonomy has not yet freed itself from a traditional hierarchical management. Here, the Japanese production model is very evident through lean management, and hierarchical relations seemed somewhat tight.

The third column (quality) is connected to one category in its pile, for all cases. This category is called group development, which, in the present case studies, has a determinant role in the achievement of good quality levels of manufactured products. The following excerpts exemplify that kind of connection:

Interview with a middle manager at company 1:

Product quality is guaranteed by the team leader in the production line [quality]; That has brought confidence to the team and more responsibility to whom is in charge of these small teams [group development].

Interview with a line leader at company 3:

There has been much progress since self-managed teams were established [group development]; Although we have few complaints from external customers, the impact of complaints is very worrying for operators [quality].

Finally, the fourth column (productivity) has a pile foundation that inserts the category performance.

Excerpt from interview with an operator at company 1:

Yes, there are always people who give more output than others [performance]; Working in a certain machine temporarily or as an experiment also increases productivity [productivity].

In Figures 2 and 3, the roadway of the bridge allows for, as we have said, the connection between group goals and customers' needs. In this deck, there are seven guardrails, which symbolize the technical and social items of teamwork. Technical items are represented by categories as operations and information. Social items are

concerned with motivation, team decision-making, participation, mutual helpfulness, and social and affective relationships.

For example, a conceptual connection between operations and motivations was identified in the data collected during team observations at company 1:

There was a malfunction of the machine and the service technician was called to resolve it [operations]; Although the machine stopped, and production was falling, the workers maintained a lively attitude [motivation]. It is important to remember that the machines' shutdown during the work shift may result in loss of pecuniary awards for the operators.

Another example illustrates the connection between team decision-making and participation. This example comes from an interview with a middle manager in case 3, which is, in our opinion (after the comparison between cases 1 and 2) the most advanced company in terms of autonomy for work teams.

We try to drive people, as far as possible, to participate in decisions [participation]; The autonomy has several levels. Self-directed teams are one year and a half old. We cannot expect operators to have full autonomy [team decision-making].

These words reveal precisely the importance of group development in terms of versatility and learning to achieve a higher level of autonomy in teams. From the information we gathered in this company, there is a clear intention to promote learning opportunities, whether in operating new machinery or in the administrative tasks transferred to the teams.

Parallelisms with other theoretical models

In this section, we will start by establishing a comparative axis between the model we propose and the sociotechnical systems' principles. Several of the nine principles (Cherns, 1993) are represented in the categories of our model. For instance, category participation is related to principle number 1, which asserts the employees' participation in task design. But we must remember that the companies we in study do not allow for the participation of workers in matters related to the design of jobs. Participation is more linked to the suggestions given by the operators regarding quality and productivity issues.

Another example has to do with the fifth principle – supervision's role on the limitation of group boundaries – which is represented by the hierarchical relationships category.

The guardrails on the roadway of the bridge, in our model, constitute another parallelism with the principles of sociotechnical systems. We use the word "parallelism", not to transmit the idea of a Xerox copy between these two approaches, but to emphasize the presence of sociotechnical determinants, which are also present in the context we have studied.

Regarding Hackman and Oldham's (1980) approach, which informs us about the task motivational structure, we find connections between our theoretical task enlargement and learning categories, which have some analogies with the variety and feedback components of tasks in Hackman and Oldham's (1980) model. Nevertheless, it's pertinent to say that several operators on the companies we have studied show some resistance to the tasks related to administrative work (fulfilment of reports). This a barrier towards the development of work groups and, therefore, a limitation to obtain more autonomy for teams. To attest this point of view, an operator at company 3, said:

“not everyone in the team wanted to learn how to fill the charts, but we established a scheme in which everyone had to do this task”.

Identity and significance tasks' components appear very evident in cases 1 and 2, where teams carry out complete tasks (the production of a steel cable and the production of passenger seats coverage respectively). In case 3, teams worked, as was said previously, in a subcomponent of the whole product (electric power assisted steering rotor). In our model, motivation also deals with task satisfaction issues, which are more relevant when operators carry out various tasks throughout the workday.

Pearce and Ravlin's (1987) model of self-regulated work groups also has some parallelisms with the explanation we have produced. For example, the previous knowledge of the group developmental stages, as referred by those authors, constitutes the pile of the quality column. It assumes a preponderant role within the auto components industry, where workers have to identify manufacturing unconformities and to solve problems related with these unconformities.

Another factor, inherent to Pearce and Ravlin's (1987) model, is concerned to the communication in teams. Once more, the analogy is achieved, by means of our communication category, which, with group composition, is the base of hierarchical relationships. Other types of analogy with communication can be found in two other categories of our explanation: external customers (related to the relations teams establish with their external environment), and information (related to specific internal communication that occurs within work teams).

One of the process criteria devised by Pearce and Ravlin (1987) is group commitment, which has some similarity with our participation category. Anyway, the perspective of Pearce and Ravlin (1987) produces, in our opinion, some ambiguity regarding activation and group processes, because, for instance, members' coordination is not achieved in early stages of group development. We think, drawing from our data, that group commitment and genuine participation are both associated with high levels of product quality and productivity, which are characteristic of technical and social mature groups. We recall here that the work groups in study are integrated in companies subdued to high quality and productivity standards. Generally, only equipment breakdowns or raw materials unconformities are responsible for the non-achievement of those patterns. Non-achievement of production and quality targets is not normally attributed to the operators' lack of performance.

The fourth theoretical explanation is the model proposed by Tubbs (1994). There is no similarity with this model in which external causal variables are concerned. In our explanation, we recognize the lack of elaboration on the external organizational issues. We only refer the external customers category, because we did not have any data referring other aspects of external environment.

Following the same train of thought, our model lacks any category regarding organizational structure, or an organizational culture and climate, although we have obtained information about that in some companies' documents being analysed. Anyway, we found theoretical relationships between technological aspects inserted in Tubbs' (1994) model and the operations category, which constitute one of the guardrails on the bridge deck. Obviously, Tubbs (1994) reference to leadership is contemplated in our model in two categories: team leadership and hierarchical relationships.

Process variables are represented in our model by categories such as Group Composition, Communication, role rotation, and team decision-making. In its turn,

output variables are concerned, in our theoretical perspective, with the following categories: Motivation, quality, productivity, and social and affective relationships. For the latter, we highlight the importance of good relations between the team members to perform a job with good productivity and quality levels. The studied companies are located in Portugal, a Latin country, and we noticed that the emotional climate of friendly teams is critical to achieve good operating results. This became evident during an interview to a team leader who works in company 1: "The performance bonus awarded to our team is the result of the great deal of fellowship among us".

Thinking more carefully, the similarities with Tubbs' (1994) model are somewhat misleading. We are specifically referring to the impossibility of separating ourselves from the context where the research was carried out: the auto components industry. Here, supervisors and middle managers constantly influence the operators' minds, mainly on the importance of customers' needs. "It's very important that operators know that we have to plan our objectives while taking into account the needs of customers" (line leader at company 3). On the other hand, our model is centred on the team functioning, although both models can be considered systemic, in their conception. But there are some nuances. For instance, in our model, inputs (group goals) and outputs (productivity and quality delivered to external customers) are directly and permanently linked, and that connection constitutes one priority for the economic and social effectiveness of work teams (Beaudin and Savoie, 1995). Another nuance comes from the nature of the bridge metaphor, i.e. a bridge is a static structure. But the static nature of the bridge is merely apparent, because there is traffic circulating on the roadway (we mean, the constant information flow between group goals and customers' needs), and, as in real bridges, there is the constant need for maintenances and structure renovations, symbolized here by the changes operated in some of the bridge's pillars (e.g. role rotation, group composition, communication). The bridge is, after all, a dynamic structure.

The fifth model about autonomy of work teams (Metlay *et al.*, 1994) – another example of a systemic explanation – is very similar to Tubbs' (1994) model. Nevertheless, Metlay *et al.* (1994) propose a theoretical scheme that abdicates of the external organizational variables. In this theoretical model we can find again some of the categories that belong to our explanation about self-managed work groups. These are the similarities: group composition translating group inputs in the perspective of Metlay *et al.* (1994); operations, communication, social and affective relationships, mutual helpfulness, and participation, translating all levels of analysis (task, group members, work group, and environment) in terms of process: quality, productivity, and motivation, corresponding to output variables in Metlay *et al.* (1994) model of group autonomy; and, finally, information and external customers compare, respectively, with the knowledge about work results (task feedback), and with the evaluation made by top managers about groups' contribution for the organization.

The theoretical approaches we have compared may be extended to the various labour contexts. In our model, we centre the approach on a specific context: the automotive components industry, in which the link between the customers' needs and group goals is determinant. Customers' information is simultaneously inputs and feedbacks to the work team; group goals are simultaneously inputs and outputs (when achieved). "We are a successful team, because we achieve the targets and this gives us more strength to continue this pace of work" (operator at company 2).

Another important aspect, given the parallels we have established, is related to the issue of leadership within the team. Theoretical approaches on work teams generally do not address the differences in the type of leadership that we found in our research. The three cases studied gave us the possibility to realize that there are three types of coordination of the team: rotational team leaders (case 1), permanent team leaders (case 2), and facilitators (case 3). The latter coordination scheme seems very innovative. Team facilitators do not constitute any kind of direct leadership to co-workers. In this scheme, teams can work without a formal leadership. The facilitator is a team mate, who carries information into the team and takes information to higher levels of hierarchy. His level of accountability is not different from their colleagues. The contact we had with the company 3 made us witness a reality that moves very quickly towards a genuine autonomy of teams. In our opinion, other companies depend too much stuck on the role played by the team leader.

Generalization issues and limitations

In the present investigation, we tried to obtain meaning from the respondents, looking for views and values, as well for acts and facts. We have adopted the constructivist approach, which is to listen to the respondents' answers in search of feelings and experiences (Charmaz, 2000). Therefore, we were not interested in samples, whose main purpose is representativeness. In our opinion, that kind of approach sees people as numbers, not as specific human beings.

According to Mucchielli (1991), qualitative research substitutes the concept of representativeness (based in samples and statistical methods) for the concept of saturation. Qualitative research fulfils the saturation criterion, whereas when collecting and analysing data doesn't bring new elements to the investigation. As a matter of fact, the last observed teams and the twelfth semi-structured interview did not produce new categories. Thereby, we think we have obtained theoretical saturation.

According to Yin's (1994) perspective, the elaboration of case studies would be unsuccessful if we tried some sort of statistical generalization of results. The same author affirms: "cases are not sampling units" (p. 31). It means that case studies are generalized for theoretical propositions and not for populations. In case studies, we face an analytical generalization. In our multiple case studies, we have dealt with the specific context of the automotive environment. Can we generalize our conclusions to other industries? We think not. No social theory can enclose all contexts, because theories are individual constructions (Burrell and Morgan, 1994). Social realities are constructed in social settings.

However, the nature of qualitative investigations leads us to the difficulty of replicate the results obtained. So, we shall face reliability problems. In order to solve this problem, Searle (1999) suggests that the investigator must use more than one data collecting technique and must ask for the opinion of an independent judge, who will codify the same data. That was precisely what we have done, asking an independent investigator to codify about 25 per cent of our data material (Butterfield *et al.*, 2005).

Anyway, some limitations can be pointed:

- We have not interviewed all team operators of a work group. We think that the corpus of the collected information would be different if the actors would have been interviewed within a group setting.

- Naturalistic observation of teams was made only by one investigator, and some internal replication difficulties could have occurred (Dey, 1993).
- Only 25 per cent of the data collected was categorized by an independent investigator. This fact has hindered the possibility of constructing a second theoretical model, which could be compared with ours.
- If we had made the interviews in a time of economical crisis (say, the year of 2009) would our model have the same configuration?

Conclusions

The results of our investigation allow us to conclude that team operators experience autonomy as something that contributes to their professional satisfaction (the interviewed operators feel so, at least), and all the operators' interviews have denoted, since they are working in self-managed teams, a strong commitment with quality and productivity team goals. These goals are a result of the bridge that connects the teams to the needs of customers. The products delivered to customers are both an output of the team and a feedback to the type of work it performed. That bridge may not be an exclusive to the automotive components industry. However, the specific context of the automotive parts production requires a strong partnership between those who produce the components and those who buy them. The car market does not tolerate quality failures and assembly plants penalize suppliers who are responsible for quality problems and stoppage of the assembly lines.

We also have concluded that the operators' participation, and their ideas suggested for many aspects related to the daily work, generates the conciliation between technical and social characteristics of team work. One example of this kind of conciliation can be found in case 3, where operators lead the rotational process of plant job assignments in every workday.

Another conclusion has to do with the relationship between team mates, after group autonomy has been implemented. In operators' own words, the intensity of relationships has increased, in the basis of "team spirit" (sic) and in the basis of group goals achievement. According to one of our interviewees (case 1), those relationships extend their action to meal and time off periods.

Regarding the question of team leadership, we have seen distinct modalities in the three studied cases. In case 1, team leadership is rotational; in case 2, team leadership is permanent; and in case 3, there is a rotational role of facilitator. All companies have successful and effective work teams. Nevertheless, we saw in case 3 the highest level of satisfaction related to the possibility to assume an extra responsibility as a facilitator, but exerting this position without possessing the feeling of command or any other hierarchical attitude. The facilitator's role implies a helpful attitude toward team-mates, giving them constant information received from upper management levels. Therefore, we think that in case 2 group structuring constitutes, at the present moment, an intermediary stage to reach, in the future, a more intense degree of teams' autonomy, because, in our point of view, the permanent leadership of the group hinders the very development of empowerment of all the operators.

Contribution

First, the present model of autonomous work groups offers to any automotive company that intends to implement this kind of work design the possibility to diagnose to what

extent operators perceive the importance of customers' needs, and, therefore, to confirm the operators' identification with team goals. We also think that operators must visit client car construction lines, in order to clearly understand why their goals (in components industry) have a specific quantification.

Second, the companies that already work with self-managed teams (but have a formal kind of group leadership) could offer their employees the possibility of working by means of a facilitation scheme, increasing the empowerment given to the group work.

Third, our model assumes that teams grow. Therefore we stress the importance of group development on quality issues. Developed teams can solve complex problems with success. Our theoretical approach calls the attention for the importance of learning, role rotation, and task enlargement, both contributing for facilitation skills, which have a crucial action on the team's development. Therefore, automotive components' companies must improve their work a design, in what the necessity of continuous operators' learning is concerned.

Fourth, the model we propose talks about the importance of good communication between teams and their supervisors, in order to sustain sociotechnical factors (located on the bridge's roadway), which assure individual motivation for team work and for group effectiveness.

Finally, we can say that our theoretical construction enhances the importance of information (emanated from upper levels of management to lower levels, and vice versa) on the functioning of work groups in the auto components industry. The role played by information is determinant for the achievement of productivity and quality goals. The organizational information transmitted to work groups also contributes for the teams' empowerment, which appears to be central in modern work designs.

Notes

1. Concerning decision-making tasks, there is, according to the opinion of Hackman and Oldham (1980), the generalized idea is that people accept decisions more quickly that had their participation.
2. Gibson and Vermeulen (2003) have shown that the level of team's diversity does not permit the prediction of a group learning's degree.
3. Four different dimensions of employee empowerment are identified by Yang and Choi (2009): autonomy, responsibility, information, and creativity.

References

- Alonso, L.E. (1995), "Sujeto y discurso: el lugar de la entrevista abierta en las prácticas de la sociología cualitativa", in Delgado, J. and Gutiérrez, J. (Eds), *Métodos y técnicas cualitativas de investigación en ciencias sociales*, Editorial Síntesis, Madrid, pp. 225-40.
- Anzieu, D. (1984), *Le Group et l'Inconscient. L'imaginaire groupal*, Dunod, Paris.
- Arrow, H., McGrath, J.E. and Berdahl, J. (2000), *Small Group as Complex Systems. Formation, Coordination, Development, and Adaptation*, Sage Publications, Thousand Oaks, CA.
- Bales, R.F. (1950), *Interaction Process Analysis: A Method for the Study of Small Groups*, University of Chicago Press, Chicago, IL.
- Beaudin, G. and Savoie, A. (1995), "L'efficacité des équipes de travail: définition, composantes et mesures", *Revue Québécoise de Psychologie*, Vol. 16 No. 1, pp. 185-201.

- Burrell, G. and Morgan, G. (1994), *Sociological Paradigms and Organisational Analysis: Elements of the Sociology of Corporate Life*, Arena, Aldershot.
- Butterfield, L.D., Borgen, W.A., Amundson, N.E. and Maglio, A.T. (2005), "Fifty years of the critical incident technique: 1954-2004 and beyond", *Qualitative Research*, Vol. 5 No. 4, pp. 475-97.
- Charmaz, K. (2000), "Grounded theory. Objectivist and constructivist methods", in Denzin, N.K. and Lincoln, Y.S. (Eds), *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA, pp. 509-35.
- Charmaz, K. (2006), *Constructing Grounded Theory. A Practical Guide through Qualitative Analysis*, Sage Publications, London.
- Cherns, A. (1993), "Principles of socio-technical design", in Trist, E. and Murray, H. (Eds), *The Social Engagement of Social Science, Vol. II. The Socio-Technical Perspective*, Pennsylvania Press, Philadelphia, PA, pp. 314-23.
- Cohen, S.G. and Ledford, G.E. (1994), "The effectiveness of self-managing teams: a quasi-experiment", *Human Relations*, Vol. 47 No. 1, pp. 13-43.
- Delbridge, R., Lowe, J. and Oliver, N. (2000), "Shopfloor responsibilities under lean teamworking", *Human Relations*, Vol. 53 No. 11, pp. 72-80.
- Dey, I. (1993), *Qualitative Data Analysis. A User-friendly Guide for Social Scientists*, Routledge, London.
- Eisenhardt, K. (1989), "Building theories from case study research", *Academy of Management Review*, Vol. 14 No. 4, pp. 532-50.
- Fontana, A. and Frey, J.H. (1994), "Interviewing", in Denzin, N.K. and Lincoln, Y.S. (Eds), *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA, pp. 361-76.
- Gibson, C.B. and Vermeulen, F. (2003), "A healthy divide: subgroups as a stimulus for team learning behavior", *Administrative Science Quarterly*, Vol. 48, pp. 202-39.
- Glaser, B.G. (1978), *Theoretical Sensitivity: Advances in the Methodology of Grounded Theory*, The Sociology Press, Mill Valley, CA.
- Glaser, B.G. and Strauss, A.L. (1967), *The Discovery of Grounded Theory. Strategies for Qualitative Research*, Aldine de Gruyter, New York, NY.
- Goodman, P.S., Devadas, R. and Hughson, T.L. (1988), "Groups and productivity: analysing the effectiveness of self-managing teams", in Campbell, J.P., Campbell, R.J. et al. (Eds), *Productivity in Organizations*, Jossey-Bass, San Francisco, CA, pp. 295-325.
- Guba, E.G. and Lincoln, Y.S. (1994), "Competing paradigms in qualitative research", in Denzin, N.K. and Lincoln, Y.S. (Eds), *Handbook of Qualitative Research*, Sage Publications, Thousand Oaks, CA, pp. 105-17.
- Guzzo, R.A. and Dickson, M.W. (1996), "Teams in organizations: recent research on performance and effectiveness", *Annual Review of Psychology*, Vol. 47, pp. 307-88.
- Guzzo, R.A. and Shea, G.P. (1992), "Group performance and intergroup relations in organizations", in Dunnette, M.D. and Hough, L.M. (Eds), *Handbook of Industrial and Organizational Psychology*, Consulting Psychologists Press, Palo Alto, CA, pp. 269-313.
- Hackman, J.R. (1987), "The design of work teams", in Lorsch, J.W. (Ed.), *Handbook of Organizational Behavior*, Prentice-Hall, Englewood Cliffs, NJ, pp. 315-42.
- Hackman, J.R. and Morris, C.G. (1975), "Group tasks, group interaction process, and group performance effectiveness: a review and proposed integration", in Berkovitz, L. (Ed.), *Advances in Experimental Social Psychology, Vol. 8*, Academic Press, New York, NY, pp. 45-99.

-
- Hackman, J.R. and Oldham, G.R. (1975), "Development of the job diagnostic survey", *Journal of Applied Psychology*, Vol. 60, pp. 159-70.
- Hackman, J.R. and Oldham, G.R. (1980), *Work Redesign*, Addison-Wesley, London.
- Ilgel, D.R., Hollenbeck, J.R., Johnson, M. and Jundt, D. (2005), "Teams in organizations: from input – process – output models to IMOI models", *Annual Review of Psychology*, Vol. 56, pp. 517-43.
- Jaques, E. (1992), "In praise of hierarchy", in Shafritz, J.M. and Ott, J.S. (Eds), *Classics of Organization Theory*, Brooks/Cole Publishing Company, Pacific Grove, CA, pp. 255-62.
- Karasek, R.A. Jr (1979), "demands, job decision latitude, and mental strain: implications for job design", *Administrative Science Quarterly*, Vol. 24, pp. 285-308.
- Ketchum, L.D and Trist, E. (1992), *All Teams are Not Created Equal. How Employee Empowerment Really Works*, Sage Publications, London.
- Lewin, K., Lippitt, R. and White, R. (1939), "Patterns of aggressive behavior in experimentally created social climates", *Journal of Social Psychology*, Vol. 10, pp. 271-99.
- Lundy, O. (1994), "From personnel management to strategic human resource development", *International Journal of Human Resource Management*, Vol. 5 No. 3, pp. 687-720.
- McClelland, D. and Burnham, D. (2003), "Power is the great motivator", *Harvard Business Review*, Vol. 81 No. 1, pp. 117-26.
- McIntyre, R.M. and Salas, E. (1995), "Measuring and managing for team performance: lessons from complex environments", in Guzzo, R.A. and Salas, E. (Eds), *Team Effectiveness and Decision-making in Organizations*, Jossey-Bass, San Francisco, CA, pp. 9-45.
- Metlay, W., Kaplan, I.T. and Rogers, E.E. (1994), "Self-management in context", in Beyerlein, M.M. and Johnson, D.A. (Eds), *Advances in Interdisciplinary Studies of Work Teams, Vol. 1, Theories of Self-managing Work Teams*, JAI Press, Greenwich, CT, pp. 167-85.
- Molleman, E. (2000), "The modalities of self-management: The "must", "may", "can" and "will" of local decision making", *The International Journal of Operations & Production Management*, Vol. 20, pp. 889-910.
- Mucchielli, A. (1991), *Les méthodes qualitatives*, Presses Universitaires de France, Paris.
- Niepc, W. and Molleman, E. (1998), "Work design issues in lean production from a sociotechnical systems perspective: neo-Taylorism or the next step in sociotechnical design?", *Human Relations*, Vol. 51 No. 3, pp. 259-87.
- Orsburn, J., Moran, L., Musselwhite, E., Zenger, J. and Perrin, C. (1990), *Self-directed Work Teams: The New American Challenge*, Business One Irwin, Homewood, IL.
- Pais, C.L.A. (2003), "As representações da liderança eficaz no contexto empresarial do Norte de Portugal", Dissertação de mestrado em Psicologia Social e das Organizações, Universidade Fernando Pessoa, Porto.
- Parry, K.W. (1998), "Grounded theory and social process: a new direction for leadership research", *Leadership Quarterly*, Vol. 9 No. 1, pp. 85-106.
- Pearce, J.A. and Ravlin, E.C. (1987), "The design and activation of self-regulating work groups", *Human Relations*, Vol. 40 No. 11, pp. 751-82.
- Peters, T.J. and Waterman, R.H. (1982), *In Search of Excellence: Lessons from America's Best-run Companies*, Harper and Row, New York, NY.
- Polley, D. and Van Dyne, L. (1994), "The limits and liabilities of self-managing work teams", in Beyerlein, M.M. and Johnson, D.A. (Eds), *Advances in Interdisciplinary Studies of Work Teams, Vol. 1, Theories of Self-managing Work Teams*, JAI Press, Greenwich, CT, pp. 1-38.

- Polychroniou, P.V. (2009), "Relationship between emotional intelligence and transformational leadership of supervisors: the impact on team effectiveness", *Team Performance Management*, Vol. 15 Nos 7-8, pp. 343-56.
- Rafferty, J. and Tapsell, J. (2001), "Self-managed work teams and manufacturing strategies: cultural influences in the search for team effectiveness and competitive advantage", *Human Factors and Ergonomics in Manufacturing*, Vol. 11 No. 1, pp. 19-34.
- Savoie, A. and Beaudin, G. (1995), "Les équipes de travail: que faut-il en connaître?", *Psychologie du travail et des organisations*, Vol. 1 Nos 2-3, pp. 116-37.
- Searle, A. (1999), *Introducing Research and Data in Psychology. A Guide to Methods and Analysis*, Routledge, London.
- Seers, A. (1996), "Better leadership through chemistry: toward a model of emergent shared team leadership", in Beyerlein, M.M., Johnson, D.A. and Beyerlein, S.T. (Eds), *Advances in Interdisciplinary Studies of Work Teams, Vol. 3, Team Leadership*, JAI Press, Greenwich, CT, pp. 145-72.
- Spear, S. (2004), "Learning to lead at Toyota", *Harvard Business Review*, May.
- Steiner, I.D. (1972), *Group Process and Productivity*, Academic Press, New York, NY.
- Strauss, A. and Corbin, J. (1998), *Basics of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*, Sage Publications, Thousand Oaks, CA.
- Sundstrom, E., De Meuse, K.P. and Futrell, D. (1990), "Work teams: applications and effectiveness", *American Psychologist*, Vol. 45 No. 2, pp. 120-33.
- Trist, E. and Bamforth, K.W. (1951), "Some social and psychological consequences of the Longwall method of coal-getting", *Human Relations*, Vol. 4 No. 1, pp. 3-38.
- Trist, E., Higgin, G., Murray, H. and Pollock, A. (1963), *Organizational Choice: the Capabilities of Groups at the Coalface Under Changing Technologies: the Loss Rediscovery and Transformation of a Work Tradition*, Tavistock, London.
- Tubbs, S.L. (1994), "The historical roots of self-managing work teams in the twentieth century: an annotated bibliography", in Beyerlein, M.M. and Johnson, D.A. (Eds), *Advances in Interdisciplinary Studies of Work Teams, Vol. 1, Theories of Self-managing Work Teams*, JAI Press, Greenwich, CT, pp. 39-66.
- Tuckman, B.W. (2001), "Developmental sequence in small groups", *Group Facilitation*, Vol. 3, Spring, pp. 66-81.
- Varney, G.H. (1994), "Control and autonomy: the primary determinant of successful applications for self-managing work teams", in Beyerlein, M.M. and Johnson, D.A. (Eds), *Advances in Interdisciplinary Studies of Work Teams, Vol. 1, Theories of Self-managing Work Teams*, Jai Press, Greenwich, CT, pp. 103-18.
- Wall, T.D., Kemp, N.J., Jackson, P.R. and Clegg, C.W. (1986), "Outcomes of autonomous workgroups: a long term field experiment", *Academy of Management Journal*, Vol. 29, pp. 280-304.
- Warr, P.B. (1994), "A conceptual framework for the study of work and mental health", *Work and Stress*, Vol. 8, pp. 84-97.
- Yang, S. and Choi, S. (2009), "Employee empowerment and team performance: autonomy, responsibility, information, and creativity", *Team Performance Management*, Vol. 15 Nos 5-6, pp. 289-301.
- Yeatts, D.E. and Hyten, C. (1988), *High-performing Self-managed Work Teams: A Comparison of Theory and Practice*, Sage Publications, Thousand Oaks, CA.
- Yin, R.K. (1994), *Case Study Research. Design and Methods*, Sage Publications, Thousand Oaks, CA.
- Yukl, G.A. (1989), *Leadership in Organizations*, Prentice-Hall, Englewood Cliffs, NJ.

Further reading

- Adler, N. and Docherty, P. (1998), "Bringing business into sociotechnical theory and practice", *Human Relations*, Vol. 51 No. 3, pp. 319-45.
- Barber, J.R. (1993), "Tightening the iron cage: concertive control in self-managing teams", *Administrative Science Quarterly*, Vol. 38, pp. 408-37.
- Emery, F. and Thorsrud, E. (1976), *Democracy at Work. The Report of the Norwegian Industrial Democracy Program*, Martinus Nijhoff Social Sciences Division, Leiden.
- Gallie, D. (2003), "The quality of working life: is Scandinavia different?", *European Sociological Review*, Vol. 19 No. 1, pp. 61-79.
- Granath, J.A. (1998), "Torslanda to Uddevalla via Kalmar: a journey in production practice in Volvo", *Seminário Internacional. Reestruturação Produtiva, Flexibilidade do Trabalho e Novas Competências Profissionais*, COPPE/Universidade Federal do Rio de Janeiro, Rio de Janeiro.
- Kan, M.M. and Parry, K.W. (2004), "Identifying paradox: a grounded theory of leadership in overcoming resistance to change", *The Leadership Quarterly*, Vol. 15, pp. 467-91.
- Kanter, R.M. (1992), "Power failure in management circuits", in Shafritz, J.M. and Ott, J.S. (Eds), *Classics of Organizational Theory*, Brooks/Cole Publishing Company, Pacific Grove, CA, pp. 449-61.
- Kao, J. (1997), *Jamming. A arte e a disciplina da criatividade na empresa*, Editora Campus, Ltda, Rio de Janeiro.
- Peters, T. (1994), *The Tom Peters Seminar*, Vintage Books, New York, NY.
- Pidgeon, N. and Henwood, K. (1997), "Using grounded theory in psychological research", in Hayes, N. (Ed.), *Doing Qualitative Analysis in Psychology*, Psychology Press, Hove, pp. 245-75.
- Stewart, G.L. and Manz, C.C. (1995), "Leadership for self-managing work teams: a typology and integrative model", *Human Relations*, Vol. 48 No. 7, pp. 747-70.

Appendix. Script of the semi-structured interview

The same questions were formulated to operators and to their superordinates. However, we have introduced some nuances when the question is related to the chain of command. For instance:

Question for the operator: "Did you feel some progress in your team results ...?".

Question for the superordinate: "Did you feel some progress in the results of the teams you lead ...?".

Therefore, we only mention one of those scripts. The word "team" or "group" was used in function of the designation that prevailed in each company.

Questions asked in semi-structured interviews

1. Autonomy

- a) Do you think that your team/group has a good level of autonomy? In what could there be more autonomy?
- b) Do you think that your team/group can solve daily problems or is the supervisor that solves them?
- c) Do the operators change their behaviour in presence of their supervisor? If that is the case, what kind of change do you see?
- d) Are objectives set by someone external to the team? How does this fact reflect itself on the autonomy given to your team?

- e) What kind of meetings does your team/group have? What is the role of those meetings in the group's work?

2. Group development

- f) Did you see any progress in your team's results, from the time when your team was constituted until the present moment? If so, what elements registered the greatest transformations?
- g) In your opinion, what is the importance of knowing how to work several machines?
- h) How do you see the possibility of learning and executing other tasks beyond machine work (e.g. entering data in computers, filling out reports)? Do you think that the members of your group are receptive to that? Why do operators prevent themselves from learning new tasks?
- i) Some members in a group are more productive than others. In your perspective, what causes such a difference?
- j) How do you feel when your team doesn't achieve the planned goals? What measures are taken to achieve goals in the future?

3. Social relationships

- k) What do you think about the meetings of your team/group? When group members have to make decisions, do you think that your team mates put group interests in front of their own interests?
- l) How do you consider the relationships within your team/group? Are there some aspects that you would like to see ameliorated?
- m) Do you see team spirit as a fundamental characteristic in your work group? Why?
- n) What are the advantages of a group that keeps the same members on the long run?
- o) Do the machines' layout in your work group offers a good possibility for communication among team members? What kind of changes would you make, if you were in charge?

4. Team leadership

- p) What would you think if a team worked without a formal leader? (facilitator – case 3)
- q) In your opinion, are all operators in conditions to exert a leadership role? (team's facilitation role – case 3). Please tell me the reasons for your answer.
- r) What do you think about rotational leadership in work teams (rotary facilitation – case 3)? Does it contribute towards the achievement of better operational outputs? Why?
- s) How have the team leader's rotation been made in your work group (case 1)? (facilitator's rotation – case 3)? What are the advantages that you see in the way rotation is made? And what do you think about the period during which an operator exerts the leader/facilitator role?

-
- t) What do you think about the people that would like to exert the leader's (case 1 and 2)/facilitator's (case 3) role and fail to do it? In your opinion, how do they feel?

About the author

Celso Luis Alves Pais has a master of arts in organisational psychology (University of Fernando Pessoa – Oporto) and is currently completing a doctoral thesis in organisational psychology. Celso's professional background includes being a supervisor in a catering company (1982-1990), a human resource manager in a textile company (1991-1993), a consultant for recruitment and selection of staff (1994-1997) and a trainer in leadership and teamwork in various industrial companies since 1998. Celso Luis Alves Pais can be contacted at: celsopais@sapo.pt