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Productivity in Knowledge Worker Teams

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Abstract The use of Information and Communication Technologies in work processes has not brought the expected productivity improvement. Some studies even suggest that the always-on model decreases productivity. This article proposes work teams as a new unit for knowledge worker productivity analysis in organizations. Organizations' ability to adopt new analysis measures is analyzed in three case studies.

Keywords: Knowledge Worker, Productivity, Team, Commitment

1 Knowledge Worker Productivity

Since Taylor's Principles of Scientific Management in 1911 (Taylor, 1911), organizational theory has provided a systematic review of the methods that can be used to arrange work activities. These methods have come to include psychological processes, social changes and technological changes such as the rise of the networked organization. As a discipline, the purpose of the organizational theory is to improve the efficient utilization of resources and establish performance standards regarding work activities. In fact, as the knowledge society has progressed the need for the standardization of the work processes and resources has increased.

The traditional way of measuring productivity is based on the relationship between the input and the output, but when analyzing productivity of the knowledge worker the main problem appears to be the difficulty of identifying what is the output. It is impossible to create a standard way of measuring knowledge workers' activities due to their highly specialized and specific task environment. Besides, part of the knowledge workers' output is usually intangible which makes measuring these activities even more difficult. (Mintzberg, 1989)

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As early as in 1999 Peter Drucker (Drucker, 1999) referred to knowledge workers' productivity as the great challenge of this century, identifying it as the true competitive advantage in a global economy. "The main economic priority of the developed countries is to raise the productivity of intellectual work and work in the service sector".

In the new development model that Castells (Castells, 1998) denominates "informational", the source of the productivity lies in the technology for knowledge generation as well as for information processing and communicating the knowledge. In this environment the main problems for controlling the productivity are the information overload and the difficulties to remain focused (Drucker, 1999).

On the other hand, the key to an effective management in knowledge networks might be a balance between free access and defined procedures or even more rigid workflows that limit workers' alternatives (Davenport, 2011).

Teamwork and the interdependence between workers have increased enormously in the last decade, but, nevertheless, performance measurements are still done on an individual basis. Companies still calculate organizational productivity through economic data, industry ratios, through top management's goals and with individual performance measures. This article suggests that the team should become the unit for analysis, as the team can be seen as the link between the individual and organizational frameworks.

2 Model for Knowledge Team Analysis

Traditionally the study of work has been centered on individual workers. The Human Resources management measures knowledge worker's individual productivity with different variables such as commitment and competencies. (Gil et al., 2008; Blumberg & Pringue, 1982 and Vroom, 1965) Commitment is one of the most widely used concepts regarding the management of knowledge workers. According to Mathieu and Zajac (1990), it is defined as the bond that an individual worker develops towards the organization and its members. Furthermore, the evolution of organizational structure and workflow theories result in a model for competence based management. Competencies can be defined as "parts of the underlying characteristics that lead individual to achieve a higher or more effective performance" (Boyatzis, 1982).

However, the ever increasing complexity of the environment forces companies to find new ways of staying competitive. One response to these changes has been the use of teams in order to solve complex problems the difficulties of which exceed a worker's individual capacity, when the work environment is unclear, ambiguous or stressful, when quick and repeated decisions are required or when the decision-making requires a more collective vision and approach. (Salas et al.,

2008 a) Therefore, the need to change the unit for analysis regarding the productivity measurements arises, and the knowledge team productivity must be considered as the base unit.

A change in the mindset in organizations is required in order to understand that now it is important to measure the activities and tasks that contribute to the common goals and strategies, and realize that knowledge workers work with each other in an interdependent way and for that reason it is practically impossible to distinguish the contribution of each of them (Moreno, 2009). Furthermore, teams respond better to the new needs of the environment because they are ubiquitous and provide diversity in knowledge, skills and experiences (Salas et al., 2008 b).

In order to understand and analyze how teams work, it is necessary to understand the context in which they are and take into consideration the diversity and skills of the individuals that belong to the team. According to Kozlowski and Ilgen (2006), teams are part of a multilevel system that consists of individual, team and organizational levels.

Teams consist of individuals who possess different characteristics and behaviors. Then, the interaction between the team members creates new characteristics and behaviors typical of that team. On the other hand, teams and the team members belong to a wider context that is the organization. (Kozlowski & Bell, 2003) The organization sets the boundaries and marks the pace for teamwork and includes the difficulties and complexity that affects it (Kozlowski & Ilgen, 2006).

Teams combine the factors affecting workers' individual productivity as well as the opportunities and the restrictions determined by the organizational resources. Therefore, teams can't be analyzed or studied in isolation. The individual influences affecting teamwork and the influences and rules set by the organizational environment must be considered. However, most of the studies on teamwork don't consider these multilevel aspects (Kozlowski & Bell, 2003).

3 Purpose and Methodology

The purpose of this study is to analyze the productivity in teams in which most of the workers fit the profile of the knowledge worker.

There is no unique model for studying the productivity of knowledge worker teams, so we propose a set of factors identified as relevant in the literature. Figure 1 gathers these factors.

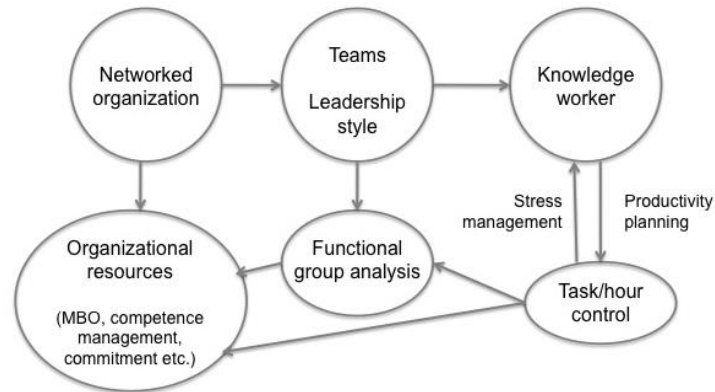


Fig. 1 The multilevel structure in organizations.

These factors have been selected taking into consideration the factors identified in literature as well as the indicators most commonly used in Human Resources policies and management.

In order to study the impact of these factors for the team productivity, three case studies have been developed. The case studies analyze the information available at the organization for evaluating the factors, the utility of the resources at a group and individual worker levels as well as practices and tools used to improve the productivity. The following tables display the study results and present the model, which standardizes the mentioned factors.

The expected outcome of this theoretical analysis and case study is the definition of a model for analyzing the productivity in knowledge worker teams. The model should include the identified key factors and allow a possible quantification of the factors in the future.

4 Case Studies

The cases were chosen to cover different knowledge worker profiles, from those who work in consultancy projects and are therefore used to control their working hours since they are used as a billing unit, to those who have mainly procedural tasks close to industrial processes but with a significant knowledge work component. The chosen case studies include a small Spanish consultancy company dedicated to organizational management and two large companies from the Spanish energy sector. In one of the electrical companies the study was made in a group belonging to the human resources department and in the other company the study took place at the engineering project implementation department. This choice of case studies has two criteria: first, the workers in the chosen teams have to be

knowledge workers, and second, the organizations needs to be varied in order to be able to study different situations in terms of the organizational resources available in each company.

Information available about the organization, teams to be studied and their members' activities and tasks were used in the study. The analyzed factors are: organizational resources for management by objectives (MBO), functional group analysis, competencies, commitment and the leadership style. The study results and the analyses are shown in the following tables.

Table 1 Analysis of the case A.

Description of the organization	Company A is a SME with 35 workers dedicated to organizational consultancy projects. The consultants' profile fits the knowledge worker profile 100% with a high degree of flexibility.
Description of pilot case	The pilot case was developed to evaluate the usefulness of the consultant's project control system in which 9 professionals took part. The project was developed under the leadership of the company's partners.
Organizational resources for MBO	Management by objectives system 100% focused on quantitative data: billing, project profitability and future projects portfolio. No Human Resources department involved.
Functional group analysis	An internal project planning and control system. Computes consultants' working hours.
Competencies	System for competence management doesn't exist.
Commitment	Company A's culture is very participatory and supportive but there is no climate survey.
Leadership style	The leadership style varies depending on which partner is in charge of the department. Culture of support is created with mutually agreed adjustment mechanisms.
Productivity	Performance is measured through the financial profitability of the projects. This system, knowing the consultants working on each project and in each department, produces reasonably good estimate of the performance of each employee. The system is based on controlling the consultants' working hours.

Table 2 Analysis of the case B.

Description of the organization	Company B is from the energy sector with over 1,500 employees. It has implemented a management by objectives system, competence management system, their internal processes are defined according to EFQM standards, they have top level information and knowledge management systems, and they are at the leading edge of the corporate social responsibility policies.
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Table 2 (continued) Analysis of the case B.

Description of pilot case	The Human Resources Department has a program oriented to professional development in the organization. Five members of this department took part in the pilot case with the purpose of helping to improve the unit's productivity. The project was developed under the leadership of the department manager.
Organizational resources for MBO	They have an MBO system with annual evaluation.
Functional group analysis	Functional-person analysis has been implemented on the manager's initiative. However, the sum of all individual objectives reached does not give clear information on group productivity.
Competencies	They have a competence management system, which includes individual competence profiles.
Commitment	Climate surveys are done but they don't provide information on individual or group commitment.
Leadership style	The company's management style is highly project-oriented with traditional hierarchical relationships.
Productivity	Workers' performance is measured through individual objectives. The company possesses powerful organizational resources and it could, therefore, be supposed that the productivity equation has all the information for all of its components. However, the workers had the feeling they were overloaded but the department manager did not have any specific tools to address this problem or to measure team productivity and distinguish between the individual productivities.

Table 3 Analysis of the case C.

Description of the organization	Company C is a multinational in the energy sector with over 30.000 employees. It has implemented a management by objectives system, a competence management system, their processes follow the EFQM standards, they have information and knowledge management systems and they have highly developed CSR policies.
Description of pilot case	The pilot case was carried out in a department for infrastructure implementation with 54 workers, 9 of whom participated in the study. The project's purpose was to analyze the sizing of the human work force for the needs of the department's project. They also needed to adapt to a new work process management platform, and they also wanted to test whether the perceived work overload was due to erroneous calculations in the job sizing.
Organizational resources for MBO	They have an MBO system with annual evaluations.

Table 3 (continued) Analysis of the case C.

Functional group analysis	The department has five systems, which provide a detailed flow of all the work activities under the study. The homogeneity of the activities enabled to analyze the fulfillment of the team goals.
Competencies	They have a competence management system linked to a very detailed job descriptions and an internal job profile control system.
Commitment	No information available.
Leadership style	The company's management style is highly oriented to engineering projects with traditional hierarchical relationships and a high degree of delegation at middle management levels.
Productivity	<p>The data obtained from the personnel time estimate and control form has provided useful information to the organization. However, its usefulness for the workers is limited by the fact that their jobs are oriented to very standard procedures.</p> <p>Worker performance is measured through individual objectives. The workflow tools limit any risks of deviation of the tasks and the periodic job sizing helps to identify the existing time thieves.</p>

The case studies show how companies measure productivity on an individual basis rather than taking into account the work teams and their outputs. However, especially the large corporations have means, such as information systems and procedures, for team based analysis. Finally, the leadership style is decisive in evaluating and implementing new approaches.

5 Conclusions

The study is based on cases of companies that are concerned about the productivity of their teams and want to improve their existing tools and processes to enhance the team productivity. The model used in the study has allowed analyzing the subject from a different perspective, and it also has pointed out the importance for studying productivity from a multilevel point of view (individual, team, organization).

How workers use the resources and take advantage of the processes that the organization offers, as well as the role of the team leader in the "administration" of these resources is the key to understanding the productivity. It is also manifested that in the team the clarity of the goals and purpose, commitment and analysis of competencies are key variables due to their impact on the individual and team productivity.

Despite the recourses and tools the organizations have to improve the productivity in the multilevel structure, companies don't have productivity measures for teams and they rely on individual performance measurement as well as on the company's overall productivity measurement. This study highlights the importance of the team productivity as one of the key variables for productivity analysis since it considers the individual factor and also the organizational factor. The future research on this topic should include a more detailed study of the multilevel structure in organizations in terms of productivity and identify the interrelationships of the factors at these levels.

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