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M. Perez
Simon Bolivar University, movalles@usb.ve

T. Rojas
Simon Bolivar University, trojas@usb.ve

L. Porras
INTESA - Venezuela, porraslo@pdvsa.com

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Perez, M.; Departamento de Procesos y Sistemas – LISI, Universidad Simón Bolivar, movalles@usb.ve
Rojas, T., Departamento de Procesos y Sistemas – LISI, Universidad Simón Bolivar, trojas@usb.ve
Porras, L., Applications Developments Department , INTESA – Venezuela, porraslo@pdvsa.com

Abstract

The goal of this research is the identification of the aspects characterizing the Organizational Culture (OC) in a Venezuelan company operating in the business of Information Systems consultancy, maintenance and development services, and the impact of the OC in the development process of Information Systems. Based on the hypothesis that there are relationships existing between the OC and the development process of systems, the present study collected up-to-date information on this relationship, taking advantage of contributions by other authors, and using known methods, techniques and tools as well as others that were generated within the framework of the research, in order to carry out a field study in the organization that was selected.

The Information Systems Development Process And The Organizational Culture

For Cortada (Cortada, 1.995), in a quality-oriented organization, processes become the core of what persons perform, functioning as vehicles by means of which employees´ daily efforts are channelled. By virtue of this, companies are using new strategies and approaches, drawing their attention to the human factor within organizations and processes, specifically to the development process, which is highly complex, as expressed by Rojas & Pérez (Rojas & Pérez, 1.995). In effect, the human component has been hardly considered in establishing improvement strategies for the development process. However, observations and studies have begun on the OC, one of the more relevant manifestations of the development process.

Denison, in his work on organizations, proposed the hypothesis that the difference between successful and unsuccessful organizations (Denison, 1.991), may be attributed to the values and principles serving as the basis for the internal organization, making emphasis on so-called bland or soft variables, such as the OC.

Specifically referring to informatics companies, Keen affirmed that the competitive advantage of companies resides in those with a more effective OC. As technology and infrastructure are available to all companies, only the OC shall determine the success of businesses (Keen, 1.997). This author emphasized that the main source of a competitive edge, sustainable through IT, is the OC of the systems-developing organization (Keen, 1.997).

In light of the aforementioned references, which stress the relevance of the OC in the development process, empirical evidence was deduced on the existence of a relationship between these constructs.

A general definition of the development process is that it consists of a series of tasks by means of which companies incorporate the IS required to achieve their business objectives into their operations, through the allocation of resources and use of technology, whether by using their own internal Information Systems Development Organization (ISDO) or through the hiring of the external services (OUTSOURCING) of companies dedicated to that purpose.

For the development process to achieve its final objective, a holistic approach must be used taking into account the elements that would help to comply with customers´ expectations, as expressed by Rojas & Pérez, when they affirmed that IS are not only an application associated to a computer program (Rojas & Pérez, 1.995), but also include their use, communication with the users, their implementation within an organization, the development thereof and their maintenance in order to attain the results offered at the time the development was decided on and the necessary resources had been committed.

Fox & Frajes have expressed the point of view of IS clients and users (Fox & Frajes, 1.997), who demand that systems-developing organizations and their processes incorporate into their tasks and products the quality, reliability and productivity standards that are characteristic of other engineering disciplines.

However, in the introduction of technologically-enhanced process elements, once again the human element is the recipient of change, and, as observed by Keen, improvements introduced in the technological component of the development process have a great impact on their human component (Keen, 1.991), such that the incorporation of technologies such as CASE tools or new Object-Oriented (OO) methodologies, recognized as key elements in IS planning, analysis, design, construction, testing and maintenance and which are the state-of-the-art of IT, require a shift in the OC of the persons participating in the process. In general, these technologies contribute to considerable improvements in the

development process, but also imply a major cultural change for the IS professionals carrying out the process.

For Cortada, a change is required in the approach towards the development process. This author states that people-associated factors (Cortada, 1.995), such as motivation, delegation, learning skills, leadership and OC, must be the focus of attention for attaining quality in the process of development.

Schein defines the OC as (Schein, 1.985): "a pattern of suppositions and beliefs, invented, discovered or developed by a specific group as it learns to solve its problems of external adaptation and internal integration, that have worked sufficiently well to be considered valid, and therefore valid enough to be taught to new members, as the correct way to perceive, think and feel with respect to situations within and outside the company". For Fuenmayor, from the systemic standpoint (Fuenmayor, 1.982), the Culture is a property emerging from the societal system, in consequence, the culture is a property that emerges from the organization, when dealing on that level.

The OC is therefore a resource of the organization, an important differentiating factor that, if properly used, will enable the company to create and maintain its competitive advantage. Cannaday expressed this, on demonstrating the existence of an important correlation between a strong OC and the effectiveness of an organization (Cannaday & Morgan, 1.997).

Methodology

Calello & Neuhaus proposed for this type of research the use of a hypothetical deductive research process, leading to the contrasting or verification of an empirical hypothesis formulated a priori (Calello & Neuhaus, 1.996).

Our General Hypothesis is formulated thus:

"A cause-effect relationship exists between the Organizational Culture of the company subject of this study and the effectiveness of the Information Systems Development Process".

And our Statistical Hypothesis:

This general hypothesis becomes operative once it is described as a statistical hypothesis in its canonical form (Goode & Hatt, 1.975), corresponding to its expression as a null hypothesis (H0) or an alternative hypothesis (H1). For the case study in question, this transformation allows its expression to be:

- H0: No relationship exists between the OC and the effectiveness of the development process.

- H1: A relationship exists between the OC and the effectiveness of the development process.

Its steps were:

a.- Measurement tools for the real-life situation

A specific survey-type tool was drafted for the study of the real-life situation, based on Kerlinger´s prescriptions for measuring the opinion of persons as the source of observation, using an appropriate scale for this purpose (Kerlinger, 1.988). The survey was drafted by means of a technique called the Technical Methodological Table (Calello & Neuhaus, 1.996). This technique leads to the definition of possible empirical indicators for each of the variables expressed in the definition of the hypothesis. These empirical indicators are observations or, in many cases, measurements corresponding to a sensitive, observable aspect of the phenomenon. Each expressed observation must be specified and analyzed as an acceptable measurement for the indicator for which it is intended. Based on the specification, a documentation source, from where the information is to be obtained, is selected. Once the source is determined, the next step in the process is to choose and specify the ideal technique for obtaining the information.

The detailed process for the construction of the Technical Methodological Table for a portion of the survey, for illustration purposes, is described next:

- Taking the expressed constructs, an initial list of semantical and technical models is established,

- Based on these constructs where the problem has been expressed and delimited, the technique describes the step-by-step construction of a pertinent preliminary survey to study the situation.

- The variables to be measured are obtained from the exposed constructs as well as those expressed in the values, beliefs and criteria, expressed through OC dissemination media or means used by the persons integrating the study population. Thus, from the lecture and analysis of the various means of information in the company subject to the study, the constructs to be considered are extracted. Table 1 shows an example.

Table 1. Technical Methodological Table

SUB VARIABLES	DEFINITION	WORK HIPOTHESIS	INDICATOR (SYMPTOM)	MEASUREMENT OBJETIVATION	SOURCE
OC variables	Company value con cept				
Employee´s commitment	The per sons proac tively commit to goal/ actions. Althouh they are not sure how to achieve the goals/ actions they trust their capa city to find solu tions	The OC tends to make known the need to commit to achieving the companies´ objetives			
			Responsibility for the results	Comparison of individual and collective responses	Persons´s opinions
			Commitment to dates		
			Acceptance of efforts		

- The constructs proposed in Table 1 are then expressed in terms of a variable (a sub variable in this case), which in itself additionally represents a possible work hypothesis.
- The symptoms or indicators for each subvariable are extracted from the concepts explicitly expressed in the definition for each of the subvariables in the company´s information channels. The source from which the observation is obtained is specified, as well as the measurement tool used for this, by using those indicated for the case study (Calello & Neuhaus, 1.996).

Once the opinion of the persons has been established, as the source for obtaining the observation, a scale must be chosen to grade the information obtained. A Lickert scale of values was used to grade the scale in this case, establishing the questions shown in Table 1 for the indicators that are being measured.

b.- Validation of the survey

The survey thus produced was submitted to revision by a group of experts in the field of Organizational Development or related to the situation under study. The survey was submitted to a pilot test to confirm its reliability as a measurement tool or procedure. The reliability test applied accepted the survey with a value of **0,05**.

c.- Determination of the population and the sample.

The population subject to this study corresponds to the persons directly involved in the development process of the company being studied, approximately 400 persons.

The survey was randomly distributed to 40 persons in the population, by remitting them to the area supervisors who were in charge of directing them to a group of persons in their work teams. A summary of the characteristics is shown in Table2.

Table 2. Characteristics of the Sample

Population	400	persons
Sample	40	persons
Percentage:	10	%
Responses:	32	persons
Percentage:	80	%
Number of demo-graphical questions:	10	
Number of objective questions	30	

d. Analysis of the information

A total of 32 surveys were received. In this case, using the survey as an information collection tool, the statistical test applied was a multiple bivariegated correlation, which maximizes the correlation among linear combinations of successive pairs of variables (Bates et al 1.995).

The test turned out to be significant for a $\alpha = 0,05$, which leads to the rejection of HØ (the null Hypothesis) wherefore it was verified that no relationship exists between the OC and development process variables.

Table 3 shows the results of the bivariegated correlation test for 4 of the questions in the survey. This example represents the completion of this same test for the 30 questions as a whole, which led to the previously mentioned results. From the observation of these results,

a high correlation (0.89) between the concepts "**Quality as an Objective**" and "**Shared knowledge and experience**" was observed. Other additional analyses of specific sets of variables must be undertaken on the results of this sample or on successive sampling with the same tool. However the most important result, which is to reject the Null Hypothesis, is fulfilled by the main objective of this study, which has been to prove the existence of a relationship between the OC and the development process (Hypothesis H1).

e.- Results

As was proved by means of the procedure and the statistical test developed in the case study, it was verified that a relationship exists between the OC and the development process, evidence of which is expressed through the success of the IS maintenance projects and tasks, in which the participants observed a higher manifestation of the elements proposed by the OC. The most frequently expressed OC values are shown in Chart Nº1.

Chart Nº1. Most frequently expressed OC Values
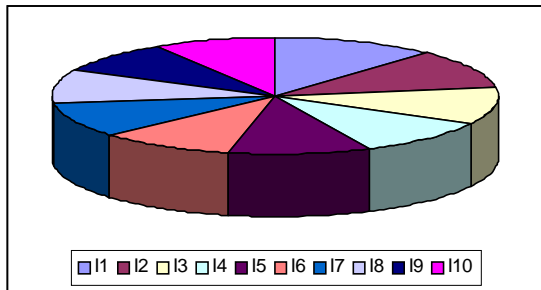
	INDICATOR
1º	Shared knowledge and Experience
2º	Quality as an objective
3º	Better decisions
4º	Company Objectives
5º	Available work Guides
6º	Team Solutions
7º	Leadership
8º	Individual accomplishments
9º	Valued Experiences
10º	Realistic Objectives

If, then, the principle of Systemic Quality (Pérez & Rojas, 1999) - which includes process effectiveness as one of its dimensions - is taken up once more, this study thus promotes a reflection on the influence exerted by the Organizational Culture as a dominant factor with respect to process effectiveness and therefore in the quality of Systems.

Conclusions

This paper describes the research carried out on the relationship between the OC and the development process in a Venezuelan information technology company. Both constructs were defined by means of their specific characteristics, as referred in the literature consulted and focused towards the real-life situation of the company under study. With respect to the relationship between the OC and the development process, it was found that they showed a statistically significant relationship for the case studied. This leads to reflecting on the incidence in the quality of the Systems, if the dimensions of systemic quality are taken as a basis.

The analysis of the information collected shows that in those IS maintenance projects and tasks showing the highest success rates by attaining greater customer satisfaction, OC manifestations were found among the team members, as demonstrated by means of a statistical test that showed a high correlation among the constructs evaluated, ratifying that process effectiveness is a dimension that has a strong effect on the quality of the systems.

Other strong correlations were observed among specific indicators, thus supporting the work hypothesis. The OC can be understood as a guideline orienting the behavior of individuals towards certain modes of action and thought, defined as acceptable, promoted as models or expected as results.

References

Bates K., Amundson S., Schroeder R. and Morris W. "The crucial interrelationship between Manufacturing Strategy and Organizational Culture". *Management Science*, (41 :10), 1.995.

Calello, H. and Neuhaus, S. "La investigación en las ciencias humanas". Método y Teoría Crítica. Fondo Editorial TROPIKOS, 1.996.

Cannaday, J. and Morgan S. "Organizational Culture And Leadership: Application Of The Organizational Culture Concept To Assess USAF Organizations", http//tuvok/au/af/mil/au.database.research/ (Current, 1.997).

Cortada, J. "TQM For Information Systems Management: Quality Practices For Continuous Improvement". New York , McGraw Hill, 1.995.

Denison, D. "Cultura Corporativa Y Productividad Organizacional". Fondo Editorial LEGIS, Bogotá, 1.991.

Fox, C. and Frajes, W. "The Quality Approach: Is It Delivering". *Communications of the ACM*, (40:6), 1.997.

Fuenmayor, R. "Discusión Metodológica Sobre El Estudio De Los Sistemas Humanos". *SISTEMAS Revista de la Escuela de Ingeniería de Sistemas*. (0:1) 1.982.

Goode, W. and Hatt, P.. "Métodos de Investigación Social". Editorial TRILLAS 1.975.

Keen, P. "Shaping The Future". *Harvard Business School Press*. 1.991.

Keen, P. Culture: The Forgotten Asset.. *Computerworld* May, (31:20), 1997, pp 70-71.

Kerlinger, F. "Investigación del Comportamiento". McGraw Hill 1.988.

Pérez, M. and Rojas, T. "SAP, Change Management and Process Development Effectiveness (II): Case Study". Paper of AMCIS 1999. Milwaukee USA. 1999

Pressman, R. Ingeniería De Software Un Enfoque Práctico. Fourth Edición. McGraw Hill 1.996.

Rojas, T. and Pérez, M. "Improvement In The Development Of Information Systems By Increasing Its Process Effectiveness". Proccedings of the America´s Conference on Information Systems. Indiana 1.997.

Schein, E. Organizational Culture And Leadership. Jossey-Bass Publishers. San Francisco 1.985.