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COMPARING THE MOTIVATION OF SPANISH COMPUTER PERSONNEL WITH THAT OF COMPUTER PERSONNEL IN FINLAND AND THE UNITED STATES

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Abstract

A survey of perceptions of IS personnel –managers, technical specialists and programmer/analysts– was conducted in Spain using the JDS/DP, a modification of the job diagnostic survey instrument. Data were collected on 15 job variables, related to four motivation aspects: job components, satisfaction levels, need for growth/achievement, and goal participation/feedback. The results were compared to those of a similar survey for the same job types in Finland. They were also compared to the norms developed for computer personnel in the United States. The survey revealed that the individuals attracted to the computer field have a high need for growth and a low need for social interaction. It also revealed that the work itself was ranked highest among 11 motivating factors. In both Spain and Finland, there was a mismatch in the job of technical specialist between the job's motivating potential and the employee's need for growth, compared to similar personnel in the United States. By examining the core job dimensions, managers can redesign the job to produce a match between these two major components of motivation.

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Introduction

During the Spring of 1993, a survey was conducted of Spanish computer personnel similar to the one on Finnish personnel reported by Couger, Halttunen and Lyytinen (1991). ATI (1), Spain's professional association for computer personnel, agreed to send the survey to its members. Some 334 responses were received. Data were collected on 15 job variables, related to four motivation aspects: job components, satisfaction levels, need for growth/achievement, and goal participation/feedback.

The study was designed to answer three questions:

Question 1 - Are Spanish computer personnel similar in characteristics to their U.S. counterparts?

Question 2 - How do Spanish responses compare to the Finnish responses?

Question 3 - Are there any Spanish job categories where there is a need to improve motivation, specifically where the job's motivating potential does not meet the growth needs of the jobholder?

Background on the Survey Methodology

The survey instrument utilized for the study was the JDS-DP II version of the Job Diagnostic Survey (JDS). The reliability and validity of the survey instrument was substantiated in 1978 (Couger and Zawacki 1980). This instrument was utilized to derive a data base on more than 12,500 U.S. computer personnel and over 13,000 computer personnel in other countries.

The JDS is based on the job characteristics model theory of motivation developed by Turner and Lawrence (1965) and expanded by Hackman and Lawler (1975). The essence of this motivation theory is that an individual's *need for growth* must be matched by the degree of *richness of the job* assigned to that individual, to ensure motivation and productivity.

Individual *growth need strength* (GNS) is defined as the strength of the individual's need for challenge, for moving beyond his/her present level of knowledge and ability, for

being stretched. The *motivating potential of a job* is determined by the degree of richness of five core job dimensions: skill variety, task identity, task significance, autonomy, and feedback from the job. The job's MPS (motivating potential score) is based on the five core job dimensions.

When MPS is matched to individual growth need, motivation can be expected to improve. If an imbalance occurs, motivation is not reaching its potential.

The United States norms resulting from the JDS-DP studies are assumed to be a satisfactory match concerning GNS/MPS. The large U.S. data base and 10 years' experience of observing their applicability in the U.S. information systems field substantiates their suitability as norms in the U.S. Prior studies using the JDS-DP in countries other than the US include studies in Austria (Couger & Adelsbergger, 1988), Singapore and Israel (Couger et al., 1989), Hong Kong, Thailand and Korea (Thompkins and Couger, 1988) and Finland (Couger, Halttunen and Lyytinen, 1991). These studies showed that despite the vast cultural differences between these countries, the characteristics of computer personnel were quite similar. In other words, computer personnel tend to be more like each other, regardless of their country of origin, than their own cultural counterparts.

In the tables below, the results of the Spanish survey are compared to the U.S. norm. An additional comparison is made with data from the Finnish survey. Thus, statistically significant differences are identified between the responses of these two countries and those of the US (which constitute the reference). In this paper, the results of the Finnish survey have been included to see how the differences between Spain and the US compare with the differences between Finland and the US. Finland has been chosen because the Finnish survey is the most recent JDS-DP study available.

Analysis of the survey results was facilitated by the use of a tailor-made program to compute and analyze data. The SPSS package was also used, for analysis of demographics.

Responses on each of the 15 survey variables will be analyzed below, grouped by survey category. Definitions of the survey variables are provided in the Appendix.

Responses on Key Motivational Factors

A second part of the survey utilized the Herzberg instrument (1959). Herzberg used his survey instrument to compare motivation factors for a variety of occupations, but did not include computer personnel. Couger (1988) replicated the study for computer personnel. Table 1 shows that the work itself was ranked in first place by Spanish computer personnel, as it was in the United States. The same was true of Finnish computer personnel. This result has been the same in every country surveyed, despite significant cultural differences: Singapore, Austria, Hong Kong, Israel, Taiwan, Australia, Thailand and South Africa.

Table 1. Rankings of the Herzberg motivational factors

Motivation Factor	U.S.	Spain	Finland
The Work Itself	1	1	1
Opportunity for Achievement	2	5	4
Opportunity for Advancement	3	2	3
Pay and Benefits	4	3	2
Recognition	5	7	6
Increased Responsibility	6	6	9
Quality of Supervision	7	9	7
Interpersonal Relations w/ Peers	8	10	5
Job Security	9	4	11
Working Conditions	10	11	8
Company Policies	11	8	10

Table 2 shows the Spanish rankings of the top four factors by gender, job type, and age. The work itself was ranked first regardless of demographic factors. Only in one age bracket was there a tie for first place: the 20-30 age bracket gave equal ranking to advancement and the work itself. In most of the other categories, the mean ranking for the work itself was marginally much greater than the rankings between other factors.

Table 2. Spanish rankings of the top factors –by gender, job, age

Motivation	Gender		Job		Age		
Factor	*Male*	*Female*	*P/A*	*Manager*	*20-30*	*31-40*	*Over 40*
The Work Itself	1	1	1	1	1	1	1
Pay & Benefits	3	2	3	2	3	3	2
Advancement	2	3	2	3	1	2	3
Achievement	5	6	5	5	4	5	6
Job Security	4	4	4	4	7	4	4

The results of the Herzberg survey are closely related to those of the JDS. The whole premise of job characteristics theory is that the work itself is the principal motivator. The results of the Herzberg survey support this premise. When managers concentrate on the key components of the job to ensure that the job's motivating potential is matched to the individual's need for growth, they are assured of satisfactory employee motivation.

This result supports the use of the job characteristics model for IS personnel. This model is oriented toward the proposition that work is the most important motivator.

Analysis of Survey Results

GNS vs MPS

It is appropriate to begin the analysis by comparing GNS and MPS. This can be considered the «bottom line» comparison for motivation, determining whether the job is rich enough to meet growth need. Table 3 provides GNS/MPS data; statistically significant differences are identified. All survey responses were recorded on a scale of 7. Unless otherwise noted, all significant differences cited in the paper are at the significance level of probability equal to or less than .05. The U.S. responses are used as the norm for comparing personnel from the other two countries.

Table 3. Comparison between the individual's growth need strength (GNS) and the job's motivating potential

Job Category	GNS	MPS
Manager		
Spain	5.85–	5.53–
Finland	6.10	5.74
United States	6.25	5.80
Programmer/Analyst		
Spain	5 79	4 95–
Finland	5.53	5.28
United States	5.97	5.23
Technical Specialist		
Spain	5.68–	5.05–
Finland	6.08	5.42–
United States	6.30	5.84

(Significant differences with respect to the United States are indicated by plus+ or minus– and are all significant at the probability <–.05 level.)

Spanish MPS is significantly lower for both programmer/analysts (P/As) and managers than for their Finnish and U.S. counterparts. GNS for Spanish managers is also significantly lower, but not for P/As. For Spanish technical specialists, both GNS and MPS are significantly lower than the U.S. norms. Finnish technical specialists have equivalent GNS to Americans but lower MPS. The implications of the variances in GNS and MPS will be discussed in the conclusions.

Core job dimensions

Table 4 shows the survey responses on the five core job dimensions that make up MPS. The responses of Spanish managers and P/As were significantly lower in three of the five core job dimensions. For both job categories, responses were lower on skill variety, autonomy and feedback from the job. The lower responses on these three core dimensions caused the job's MPS to be significantly lower than either the U.S. or Finnish results.

Table 4. Comparative responses for five core job dimensions: managers and programmer/analysts

Job Category	Skill Variety	Task Identity	Task Signif.	Autonomy	Feedback from Job
Managers					
Spain	5.93–	5.73	6.12	5.63–	5.16–
Finland	6.00	5.26–	5.96	6.31	5.26
United States	6.15	5.80	6.30	6.05	5.30
Programmer/Analyst					
Spain	5.00–	5.39	5.68	4.82–	4.89–
Finland	5.09	5.17	5.50	5.52	5.03
United States	5.06	5.28	5.15	5.26	5.45

(Significant differences, indicated by plus+ or minus–, are all at the probability <–.05 level.)

Finnish managerial responses were significantly lower than U.S. norms on one job variable, task identity, but that one variable was not enough to make MPS significantly different. Finnish P/A responses were not significantly different. That is, Finnish responses on the five core job dimensions that make up the job's motivating potential were not different enough from those of their American counterparts for the MPS to be significantly different.

Finnish managers and programmer/analysts perceive their jobs much as the do Americans as regards the degree to which the core job dimensions are provided. Spanish managers and P/As perceive their jobs to be much lower in the core job dimensions than their U.S. or Finnish counterparts.

Table 5 shows responses for a problematic job: technical specialist. The responses of both Finns and Spaniards are significantly lower than those of Americans. The technical specialist category includes systems programmers, data base designers and network designers. The Spanish responses are significantly lower than their U.S. equivalents on all five core job dimensions. Finnish technical specialists have significantly lower responses on three core job dimensions: skill variety, task identity and feedback from the job. Approaches to correcting this problem will be discussed in the conclusions.

Table 5. Comparative responses for five core job dimensions: technical specialist

Job Category	Skill Variety	Task Identity	Task Signif.	Autonomy	Feedback from Job
Technical Specialist					
Spain	5.42–	5.10–	5.64–	5.09–	4.79–
Finland	5.50–	5.07–	5.75	5.84	5.05–
United States	5.90	5.48	5.93	5.88	5.93

(Significant differences are indicated by plus+ or minus– and are all at the probability <–.05 level.)

Goal Related Variables

Table 6 provides a comparison of responses on the goal related variables: goal clarity, goal setting participation and feedback on goals. Compared to the United States, Spanish managers evidenced a significantly lower response in only one of the three categories –goal setting participation. Feedback on goals was significantly higher. Finnish managers rated feedback on goals significantly lower. Spanish P/As rated goal clarity significantly lower, while Finnish P/As rated both goal clarity and feedback on goals significantly lower. Spanish technical specialist ratings were not significantly lower on any of the three factors, but Finnish responses were lower on two of the three: goal clarity and feedback on goals.

Table 6. Comparative responses on goal-related variables

Job Category	Goal Clarity	Goal Setting Participation	Feedback on Goals
Manager			
Spain	5.34	5.12–	4.71+
Finland	5.15	5.36	3.47–
United States	5.20	5.50	4.22
Programmer/Analyst			
Spain	5.27–	4.17	4.24
Finland	4.97–	4.15	3.57–
United States	5.69	4.17	4.49
Technical Specialist			
Spain	5.17	4.40	4.02
Finland	4.97–	4.85	3.33–
United States	5.70	4.78	4.37

(Significant differences, indicated by plus+ or minus–, are all at the probability <–.05 level.)

Table 7 could have been consolidated with Table 6, but we preferred to highlight the problem of general feedback. Responses on feedback on goal setting (Table 6) hover around the midpoint of the rating scale. They are all lower than desired, in all three job categories. The same thing applies to feedback in general. As Table 7 shows, only two of the nine responses are significantly different. However, note that the norm for U.S. analysts is quite low. Apparently, there is not a good role model on feedback for any job type. Management attention is needed in this area.

Table 7. Comparative responses on feedback in general

Job Category	Feedback In General
Manager	
Spain	4.03
Finland	3.89
United States	4.10
Programmer/Analyst	
Spain	4.04
Finland	3.57–
United States	4.24
Technical Specialist	
Spain	3.87
Finland .	3.73–
United States	4.28

(Significant differences, indicated by plus+ or minus–, are all at the probability <–.05 level.)

Satisfaction Levels

Table 8 provides the survey responses on the satisfaction variables. Spaniards perceive supervisory satisfaction significantly lower than their American counterparts in two of the three job types: P/A and technical specialist. P/As are the only job type in Finland to respond significantly lower than their American counterparts. Pay satisfaction is not significantly different for any job type among the three countries. General satisfaction is not significantly different among the three countries.

Table 8. Comparative responses on satisfaction variables

Job Category	General Satisfaction	Supervisory Satisfaction	Pay Satisfaction
Manager			
Spain	5.29	4.50	4.68
Finland	5.31	4.45	4.68
United States	5.35	4.55	4.85
Programmer/Analyst			
Spain	4.96	4.33–	4.29
Finland	4.96	4.09–	4.25
United States	5.14	4.94	3.74
Technical Specialist			
Spain	4.98	4.15–	4.43
Finland	5.32	4.33	4.48
United States	5.28	4.76	4.85

(Significant differences, indicated by plus+ or minus–, are all at the probability <–.05 level.)

Social Need Versus Growth Need Strength

Table 9 provides a survey result that has been found in all countries where computer personnel have been measured with the JDS-DP. The strength of the need for growth is very high. In the U.S., the GNS of computer personnel is the highest of all 500 occupations measured with the JDS. Finnish computer personnel exhibit similar behavior. The computer field attracts personnel who have a very high need for challenge, for being stretched. Although there are some significant differences, all the GNS responses are high in light of the scale of 7.

Table 9. Responses on social need strength versus growth need strength

Job Category	GNS	SNS
Manager		
Spain	5.85–	4.69+
Finland	6.10	4.53
United States	6.25	4.45
Programmer/Analyst		
Spain	5.79	4.68+
Finland	5.53	4.51
United States	5.97	4.46
Technical Specialist		
Spain	5.68–	4.64+
Finland	6.08–	4.03
United States	6.30	4.44

(Significant differences, indicated by plus+ or minus–, are all at the probability <–.05 level.)

Conversely, the social need strength of personnel in the computer field is the lowest of all 500 occupations measured in the U.S. The computer field attracts people who work very well alone. Finnish computer personnel are no different from their U.S. counterparts in this respect, according to the survey results. However, Spaniards experience significantly higher social need strength in all three job categories. Yet, all responses are quite low on a scale of 7.

This attribute has often proven to be detrimental. Computer personnel may not interact often enough with their clients to ensure that the applications being developed truly meet client needs. This is also a reason for the low rating on feedback from management. Since both managers and subordinates have low need for social interaction, they do not interact frequently enough to provide adequate feedback.

Conclusions

To analyze approaches to improving mismatches in GNS/MPS, let us begin with the technical specialist category. Table 3 shows that for Finnish technical specialists there is a

serious imbalance. The job's motivating potential is significantly lower than the U.S. norm, yet GNS is significantly higher. These results indicate that the job is not sufficiently challenging. Looking at Table 4, we see that three core job dimensions are the cause of this problem: skill variety, task identity, and feedback from the job itself. To improve this situation, managers can call the technical specialists together and ask their opinions on changes that would provide more skill variety. To improve task identity, managers can spend more time explaining how the work of these employees relates to the organizational goals and how it impacts others in the organization. To improve feedback from the job itself, managers can help technical specialists develop performance measures for the overall job and for tasks within the job.

The situation is different for Spanish technical specialists. While their GNS is significantly lower than that of their U.S. counterparts, so is their MPS. Therefore, there is no mismatch; both MPS and GNS are lower by the same amount. This situation does not call for special management attention unless the circumstances of these jobs change. If the nature of the work changes, the jobs need to be reevaluated. For example, more and more of the work of systems programmers is being accomplished by operating system software. At some point, MPS will have diminished enough to create an imbalance.

The same results were found for Spanish managers. GNS and MPS are equivalently lower than those of their American and Finnish counterparts. Therefore, there is no mismatch. However, there is a mismatch for Spanish programmer/analysts. While GNS is not significantly lower than that of the U.S., MPS is. As shown in Table 4, the core job dimensions that cause this result are skill variety, autonomy, and feedback from the job. The managers of these personnel need to explore with the P/As the factors that led to their low responses on these job dimensions. For example, consider the two lowest rated factors, autonomy and feedback from the job. To improve autonomy, managers should consider placing greater emphasis on setting clear goals and allowing P/As freedom of choice on how to meet those goals, so long as they do actually meet them. To improve feedback from the job, more metrics should be established, so P/As can track their own performance against goals and standards.

Despite some of the problems identified by the two surveys, a healthy motivation environment exists for both the Spanish and Finnish computing communities, gaged by comparing their responses to the U.S. environment. General satisfaction (Table 8) is not significantly different.

Responses on goal feedback and general feedback reveal a need for special management attention in all three countries. The responses hovered around the midpoint of the scale of seven, indicating an opportunity for improvement. This is a universal problem that affects not only these three countries but all the countries where computer personnel have been measured with the JDS/DP. One cause is the low social need of people in this field. While people rarely change their need for social interaction, they can change their behavior. U.S. companies have instituted training programs to help computer personnel learn techniques to communicate more effectively and to work more effectively in groups. When the personnel have the «need awareness», they work diligently to acquire these new skills. Apprising them of their low SNS, in an occupation where strong relationships with clients are essential, is usually sufficient to attain the need awareness for additional training. To put it another way, when it is made clear to them that they need better interactive skills to do their jobs properly, their high need for growth will motivate them to acquire the behavioral skills needed to overcome their low SNS. □

(1) ATI: Asociación de Técnicos en Informática.

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Appendix

COMPARING THE MOTIVATION OF SPANISH COMPUTER PERSONNEL WITH THAT OF COMPUTER PERSONNEL IN FINLAND AND THE UNITED STATES

Definition of survey variables

1. Key job dimensions: Objective characteristics of the job itself.

A. *Skill Variety:* The degree to which a job involves a variety of different activities that require the use of a number of different skills and talents on the part of the employee.

B. *Task identity:* The degree to which the job requires the completion of a «whole» and identifiable piece of work– i.e., doing a job from beginning to end with a visible outcome.

C. *Task significance:* The degree to which the job has a substantial impact on the life or work of other people, whether in the immediate organization or in the external environment.

D. *Autonomy:* The degree to which the job gives the employee substantial freedom, independence, and discretion in scheduling his/her work and in determining the procedures to be used in carrying it out.

E. *Feedback from the job itself:* The degree to which carrying out the work activities involved in the job results in the employee's obtaining information about the effectiveness of his or her performance.

2. Satisfaction measures: The private, affective reactions or feelings an employee gets from working on his job.

A. *General satisfaction:* An overall measure of the degree to which the employee is satisfied and happy in his or her work.

B. *Specific satisfactions:* These scales tap several specific aspects of the employee's job satisfaction:

B1. Pay satisfaction
B2. Supervisory satisfaction
B3. Satisfaction with co-workers

3. Social need strength: This is a measure of the degree to which the employee needs to interact with other employees.

Appendix (continued)

4. Goal clarity and accomplishment: These scales measure the degree to which employees understand and accept organizational goals. Further, it taps into employees' feelings about goal setting participation, goal difficulty, and feedback on goal accomplishment.

A. *Goal clarity.* How clear and specific the goals are for the job or the individual. The individual has a clear sense of priorities on his/her goals.

B. *Goal difficulty.* The extent to which goals or work objectives demand a great deal of effort.

C. *Goal acceptance.* The extent to which the person is willing to accept organizational goals.

D. *Goal setting participation.* The employee's feeling of being involved in the goal-setting process –of having an impact.

E. *Feedback on goal accomplishment.*

5. Individual growth need strength: This scale measures the individual's need for personal accomplishment and for learning and developing beyond his/her present level of knowledge and skills.

6. Motivating potential score: A score reflecting the potential of a job for eliciting positive internal work motivation on the part of employees.

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