Mentoring Programs: A study the of the Spanish Software Industry

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Keywords: Mentoring; Human Capital development; IT Organizations; People-CMM.

Abstract: Mentoring is a very important tool for the

development of human capital in IT Organizations. In such organizational environments, professional practice must be continually revised and improved in order to adapt workers competences to technical innovations. As a result of these circumstances, mentoring practices are widely accepted in these particular types of organizations and several maturity frameworks in IT field (People-CMM) recommend mentoring as a practice to develop and retain IT personnel.

Due to the ever-growing importance of mentoring processes in technology firms, in this work we point out the best way to design and apply mentoring programs in three multinational companies devoted to technological consulting. Our main goal is to compare and provide an accurate benchmarking of the application of mentoring programs in these three companies, with the recommendations provided by reference frameworks such as People-CMM.

The outcome shows that there is a potentially large discrepancy between the practical application of mentoring programs in the selected multinational companies and the relevant theoretical recommendations of People-CMM guidelines.

Reference to this paper should be made as follows: .....

Biographical notes:

Cristina Casado-Lumbreras is a Senior Consultant at Gesfor, one of the leading companies in IT sector in Spain. She received her PhD in Psychology from the Universidad Autónoma of Madrid (2002). He has been working in several research institutions and Universities since nineties including Universidad Autónoma of Madrid, Universidad Complutense of Madrid and Escuela de Administración de Empresas (EAE). Her research interests include human capital development, staffing and, lately, feelings management in organizational contexts.

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1. Introduction

In the last decade, the search for utmost quality in an organizations core has favoured and encouraged the use and application of training and human resources development techniques, which focus on conductive efficiency and hence, organizational efficiency. The momentum gained by

these people development techniques has fostered practices and processes that harness the potential of training and learning, improving the performance of individuals and groups. Among these practices, coaching and mentoring processes are highly relevant. These techniques offer an obvious benefit in terms of individuals and groups and, as a consequence, benefits spread all over the organization.

The origins of the mentoring term can be traced back to the history of Ancient Greece. In Homer´s masterpiece, "The Oddissey", Ulises, king of Ithaca, delegates his house and the education of his son, Telemachus to Mentor Alcimida, when he is leaving for the Troy War (traditionally dated on 1193 BC-1183 BC). Nevertheless, different authors (Huang & Lynch, 1995) claim that, despite the term having its origin in Ancient Greece, the concept stems from methods and techniques of three Chinese kings, Yao, Shun and Yu around 2333 and 2177 BC. These authors state that in the Government delegation which took place at the time of these rulers, many of the elements considered as key in mentoring today, were used. Therefore, despite the importance of the classical Greek etymology, the Chinese origin would be earlier than the Greek one.

Apart from its origin, current literature stemming from a number of disciplines (Management, Social Psychology, Sociology, Knowledge Management, etc) has provided a significant number of studies about mentoring from the late seventies to the 20th century, as can be found in (*e.g.* Kanter, 1977; Phillips, 1977; Collins & Scott, 1978). As a consequence of the interest raised by the topic and its broad application to business environments, multiple definitions of the term have been coined. Hence, Friday, Friday and Green (2004) have undertaken a re-conceptualization of the term from an in-depth study of existing literature definitions. Mentoring has thus been defined as an improvement process concerning a number of aspects related with a professional career, but also with the global improvement of the individual, which requires a senior advisor and a junior protégé. The established relationship implies benefits for both sides involved. The protégé obviously achieves a remarkable improvement in his professional career, promotion-wise (Dreher & Ash, 1990; Scandura, 1992), a higher income (Dreher & Ash, 1990; Whitely, Dougherty & Dreher, 1991), better political skills (Blass & Ferris, 2007) and more satisfaction and social acceptance in the working environment (Chao, Walz, & Gardner, 1992). On the other hand, mentors benefit from high-speed promotions, reputation and personal satisfaction (Hunt & Michael, 1983; Zey, 1984; Scandura, Tejeda, Werther & Lankau, 1996). Finally, organizations consequently gain a higher motivation from employees, more working stability and the improvement of leadership and

development skills in its core (Hunt & Michael, 1983; Viator & Scandura, 1991; Levesque, O´Neill, Nelson & Dumas, 2005), being able to rely on employees with more adaptation skills, ready to face a decision making process with more guarantees (Ragins & Scandura, 1999), develop social capital in broader social networks (Hezlett & Gibson, 2007) and finally, support knowledge transfer across projects (Landaeta &Kotnour, 2008).

As discussed in Nielson & Eisenbach (2003), there are three main factors, codenamed as "demographic" that might influence the productivity of the mentoring relationship: firstly, the duration and secondly the type (formal or informal) and, lastly, the demographic composition of the relationship (in terms of gender and race, mostly, the latter quite variable and more relevant in inter-cultural societies like the USA). The first two variables are interconnected, it has been proved that informal mentoring relationships take more time and outperform formal relationships in terms of professional development (Chao, Walz, & Gardner, 1992). An study of how both informal and informal mentoring enhances knowledge management can be found in (Karkoulian, Halawi & McCarthy, 2008). Concerning demographic compositions, different features of the binomial structure also affect the final outcome of the process, both sides being of the same race and gender being the most productive relationships (Nielson & Eisenbach, 2003).

Mentoring in the IT field

Mentoring has been proposed as a suitable model for the transition from the academic to the professional stage from the information systems viewpoint (Hansman, 2002; Hallam & Newton-Smith, 2005). In systems development projects, mentoring dramatically reduces the learning curve for non-experienced human resources (Ramaswamy, 2001). Mentoring is a social technique that allows an improved person / responsibilities adjustment and a stronger identification with the organization (King, Xia, Campbell & Sethi, 2005). Particularly, in Software Development companies, mentoring has been identified as a technique or strategy used for Knowledge Management (Fehér & Gabor, 2006).

In an upcoming work in the Software Engineering domain, Niazi, Wilson and Zowghi (2006) point out that mentoring is a vital element of the software process improvement implementation. The authors build their results on the basis of a literature survey stating that mentoring is identified as a Critical Success Factor for the set-up of these kinds of programs for 49% of the overall case space. Empirical studies taking as a sample 34 software professionals familiarized with the Software Process

Improvement, show that 23 of them (68%) point out mentoring programs as a key factor in these types of projects for the implementation of the best strategies in the software development field.

Based on current research, it appears that the most complete and ambitious theoretical proposal in the IT area has been developed by the Software Engineering Institute at the Carnegie-Mellon University. Encouraged by the mentioned institution, a number of Software Engineers and Human Resources researchers have developed a set of models to help organizations in management and intellectual capital development. This initiative is called People-CMM (Curtis, Hefley & Miller, 2001) and it is based on the most successful strategies for Human Resources, knowledge management and organizational development. People-CMM is deemed as a prominent set of guidelines to achieve a steady and ever-increasing improvement of the organizations work force. The ultimate goal is to improve the capability of the organizations to attract, train, motivate, organize, manage and maintain their human resources.

In this work we have focused specifically on IT organizations with the aim of finding out and proving the design and application of their mentoring programs, and analysing whether they comply with the recommendations and suggestions of complete and fully-fledged reference frameworks such as People-CMM (Curtis et al, 2001).

2. The Study

Here we present a qualitative introductory study through which we have tried to evaluate the way in which mentoring programs are designed and applied in three companies devoted to technological consultancy. This study is focused on consulting companies due to the particular characteristics of their environments which are highly dynamical and extremely demanding. As a consequence, guidance or Mentoring programs gain special relevance as they favour the adaptation and the performance of the workers. It should be remarked that the development of this study required the fundamental collaboration of the three firms and the contribution of their professionals to the elaboration of the different tests. The selection of the companies was made following a set of four criteria. The first one is the willingness of the companies to take part in the study. It was also required that each company implemented formal mentoring programs. Thirdly, the target companies should have over 500 employees in the country where the study was taking place, Spain in this case. And lastly, it was necessary to study companies with at least a L2 maturity level in software development according to CMMi (Software

Engineering Institute, 2006).

Our purpose has been to compare how these mentoring programs work and fit in these three companies with the recommendations provided by People-CMM (Curtis et al, 2001). None of the aforementioned companies has been certified on People-CMM; however, they had different CMMi maturity levels.

To achieve this goal, we have compared descriptions and opinions of the mentees in these companies with such recommendations. The mentees have been interviewed by means of a questionnaire which is analyzed later in this article.

The main objective of this study is, focusing on medium-large sized companies, to establish the dissimilarities existing between the practices recommended by People-CMM and its effective implementation, taking into account that the companies have reached a certain maturity level in software development.

Participants

Five mentoring program participants have been interviewed in each of the three World Wide companies selected, i.e. fifteen people. The sample is composed of software engineers (junior and senior) and project managers. None of the interviewed has been a mentor of any other employee. The average time of receiving of the program is around 3.2 years. The average age of participants is 32.2 years. The sample is composed of 9 males and 6 females. Participants were selected through a call via the internal communication channels of the three companies. Therefore, their participation was voluntary and they are a representative sample of the technology sector with regard to age, education/training and average years receiving mentoring.

Questionnaire

The questionnaire is composed of 30 open-ended questions based on the recommendations and descriptions of the People-CMM (Curtis et al, 2001). The questions have been partitioned into the following categories: *mentoring goals, mentor roles, feedback and evaluation, first phases and process evolution, information and communication*, apart from a final section in which *global perception of mentoring receiver* is depicted concerning the mentoring program received.

3. Results

A content analysis regarding the conceptual categories established a priori and integrated in the questionnaire is presented below. Results show that the selected companies deemed the conception and application of mentoring programs as very important. However, the people interviewed agreed that there was a distance between the theory and the real world of mentoring. In what follows, we will analyze in detail the different conceptual categories in which the interview took place.

Mentoring Goals

Most of the people interviewed mention that their companies are providing a path to ease the adaptation to each organization, as well as support for the acquisition of skills, competence development, and so on. Furthermore, depending on the mentee's profile, specific management knowledge acquisition, equivalent to executive skills are provided. In addition, the mentoring program provides global support and personalized support. Nonetheless, 73% of the participants interviewed agree that there is guidance and support for the improvement of the mentee performance.

They also agree upon the system providing career development, but the interest in such career evolution is hampered by the mentee himself, since the interests and goals of the organization do not coincide with the interests and goals of the employee (as can be depicted in project assignment scenarios suggested by the mentoring program, even when not requested by the mentees).

Finally, most of the interview participants consider that mentors provide useful and fruitful counselling for employment problems.

Mentor Roles

Interview participants have been asked about potential roles adopted by their mentors, such as the following: *model role*, *personal counselor*, *career counselor*, *knowledge and skills developer*, *working or performance counselor or "problem-solver" expert*.

Results show that most roles adopted by mentors are personal counselor (86%) and "problem-solver" expert. On the other hand, expert, knowledge and skills developer, working or performance counselor are the most unlikely roles among mentors.

Feedback and evaluation

The interviewed mentees agree upon the fact of being requested to provide an evaluation of the mentoring programs once or twice a year. This

evaluation is performed mainly to acknowledge the fulfilment of program goals. Thanks to the periodic evaluations, it is less necessary to arrange meetings for mentors and mentees to give suggestions and recommendations intended to improve the program.

First Phases of the Process

There is no consensus among the interview participants concerning training or directions prior to the mentoring process. For some of them (46%) there are no directions and for the rest this is addressed via meetings, talks and get-togethers.

During the first get-together sessions of the mentoring process a number of basic agreements are made on what the relationship will build on. Fundamentally, goals to be achieved with the mentoring process, duration of the process or how progress will be evaluated are the topics discussed. However, despite specific goals to be achieved being proposed by mentors and their counter partners, lack of strategic planning is also found (40%).

Finally, participants mention that evaluation concerns knowledge, skills and competencies or capabilities that the mentee needs to develop (73%). Despite this, it is not very likely that the mentor can ensure that the mentee acquires and applies those competencies or skills in the working environment (66%).

During the Process

Most of the participants agree on the fact that, during mentoring sessions, the most common activities are those related to the identification of strengths and weaknesses; the analysis of barriers or obstacles for working performance or career development; the identification of potential necessary changes of attitude; career options analysis and required skills, as well as actions and plans supporting development needs.

Information and Communication

Regarding information received about the program, all participants mentioned that they were informed about the goals and the program structure before it commenced. Although that information does not happen to be training or directions prior to the process, as we already mentioned. Furthermore, before joining the mentoring program, a number of doubts

can be solved through the mentor or the Human Resources department of the company.

Global Perception of the Mentee

All participants agree on considering mentoring programs as useful and necessary tools for their respective organizations. In this sense, it is mentioned that it is very positive that the functional hierarchy will be upported by the "control system" that mentoring implies (60%). Moreover, mentoring favours satisfaction and motivation of the employee, which also leads to a beneficial increase in performance (80%). In addition, it is mentioned that, in some organizational contexts, mentors are a permanent referent for senior managers and partners, who rotate too frequently as a consequence of a dynamic and ever-changing environment.

This way, mentees agree that it is recommendable for mentoring programs to be mandatory (60%), since joining implies participating and enrolling in the activity and goals of the company with all the advantages of the process such as training, skill development, career development and so on. Participants also notice that programs are well conceived, but its real application is far from the theoretical premises (60%): demands of a complex environment determine that the application of the theoretical conception of programs is not always possible. This factor is mentioned asone of the most important aspects to be improved (73%).

Another negative aspect is the difficulty of combining the process with working responsibilities (86%). This ideal equilibrium must be provided by the organization (60%).

Finally, none of the selected organizations envisage mentoring for working groups.

4. Conclusions and future work

After carefully analyzing the results, a first conclusion is the well-grounded commitment of the selected organizations with mentoring programs, as well as their interest in satisfying reference framework recommendations such as the People-CMM and the like. For example, this interest is depicted in several organizations' concern about each mentor being exclusively devoted to mentoring, or the fact of having mentoring programs based in well-founded Learning Management Systems. The interest in leading and developing the professional career implies a very powerful motivation and satisfaction driving-force which has an impact on

performance and strong commitment.

Nevertheless, the distance between theoretical program design and its application is one of the factors that decrease the efficiency of the concept, which affects in a negative way the relationship between employee and organization.

Also, it is of the utmost importance for the organization to favour the trade-off between mentoring programs and working responsibilities; excess workload would lead to non-suitable mentoring conditions. Hiring mentors or external coaches, or having mentors devoted exclusively to the activity of mentoring (as we have mentioned this happens in a number of companies), would encourage the application of programs and decrease the distance between theoretical design and real-world scenarios.

As a future work, we suggest the completion of the obtained description from the interviewed participants, with the one provided by the mentors and the managers responsible for designing mentoring programs. The potential of finding differences in compared research such as the one suggested would not only confirm the distance between theory and real-world scenarios, but it would also provide a number of key concepts for the improvement of these kind of human capital development programs. Last but not least, the sample increase and an extension of the categories of analysis are some of the future work cornerstones that we will take as a basis for future research.

5. References

Blass, F.R. &Ferris, G.R. (2007). Leader reputation: The role of mentoring, political skill, contextual learning, and adaptation. *Human Resource Management, Vol.46*, No. 1, pp. 5-19.

Chao, G. T., Walz, P. M., & Gardner, P. D. (1992). Formal and informal mentorships: A comparison on mentoring functions and contrast with nonmentored counterparts. *Personnel Psychology, Vol. 45*, pp. 619-636.

Collins, E.G. & Scott, P. (1978). Everyone who makes it has a mentor. *Harvard Business Review, Vol. 56*, pp. 89-101.

Curtis, B. Hefley, W.E. & Miller, S.A. (2001). *People Capability Maturity*

Model. Version 2.0, CMU/SEI-2001-MM-01

Dreher, G. F., & Ash, R. A. (1990). A comparative study of mentoring among men and women in managerial, professional, and technological positions. *Journal of Applied Psychology, Vol. 75*, pp. 539-546.

Fehér, P. & Gábor, A. (2006) The Role of Knowledge Management Supporters in Software Development Companies. *Journal of Software Process Improvements and Practice, 11*(2), pp. 251-260.

Friday, E. Friday, S.S. & Green, A.L. (2004). A reconceptualization of mentoring and sponsoring. *Management Decision, Vol. 42*, No. 5, pp. 628-644.

Hallam, G., Newton-Smith, C. (2005). Evaluation of transitional mentoring for new library and information professionals. *Library Management. Vol. 27*, No. 3, pp. 154-167

Hansman, C. A. (2002). *Critical perspectives on mentoring: Trends and issues*. ERIC, Ohio State University.

Hezlett, S.A. & Gibson, S.K. (2007). Linking Mentoring and Social Capital: Implications for Career and Organization Development. *Advances in Developing Human Resources, Vol. 9*, No. 3, pp. 384-411.

Huang, C.A. & Lynch, J. (1995). *Mentoring: The Tao of Giving and Receiving Wisdom*. San Francisco: Harper Collins.

Hunt, D.M. & Michael, C. (1983). Mentorship: a career training and development tool. *Academy of Management Review, Vol. 8*, No. 3, pp. 475-85.

Kanter, R.M. (1977). *Men and Women of the Corporation.* New York: Basic Books

Karkoulian, S., Halawi, L.A. & McCarthy, RV. (2008). Knowledge management formal and informal mentoring: An empirical investigation in Lebanese banks. *The Learning Organization, Vol. 15*, No. 5, pp. 409-420.

King, R.C., Xia, W., Campbell, J. & Sethi, V. (2005). Socialization and organizational outcomes of information technology professionals. *Career Development International. Vol. 10*, No. 1, pp. 26-51.

Landaeta, R.E. & Kotnour, T.G. (2008) Formal mentoring: a human

resource management practice that supports knowledge transfer across projects. *International Journal of Learning and Intellectual Capital, Vol. 5*, No.3/4, pp. 455–475.

Levesque, L.L, O'Neill, R. M., Nelson, T. & Dumas, C. (2005). Sex differences in the perceived importance of mentoring functions. *Career Development International, Vol. 10*, No. 6, pp. 429-443.

Niazi M., Wilson D., & Zowghi D. (2006) Critical Success Factors for Software Process Improvement Implementation: An Empirical Study. *Journal of Software Process Improvements and Practice, 11*(2), pp. 193-211.

Nielson, T. R. & Eisenbach, R. J. (2003). Not All Relationships are Created Equal: Critical Factors of High-Quality Mentoring Relationships. *The International Journal of Mentoring and Coaching, Vol. 1*, No. 1.

Phillips, L.L. (1977). *Mentors and protege´s: a study of the career development of women managers and executives in business and industry*. UCLA, Los Angeles, CA: Doctoral dissertation.

Ragins, B. & Scandura, T. (1999). Burden or blessing? Expected costs and benefits of being a mentor. *Journal of Organizational Behavior, Vol. 20*, No. 4, pp. 493-510.

Ramaswamy, R. (2001). Mentoring Object-Oriented Projects. *IEEE Software, Vol. 18*, No. 3, pp. 36-40

Scandura, T. A. (1992). Mentorship and career mobility: An empirical investigation. *Journal of Organizational Behavior, Vol. 13*, pp. 169-174.

Scandura, T., Tejeda, M., Werther, W. and Lankau, M. (1996), Perspectives on Mentoring. *Leadership & Organization Development Journal, Vol. 17,* No. 3, pp. 50-8.

Software Engineering Institute (2006) CMMI for Development, Version 1.2, Technical Report, CMU/SEI-2006-TR-008, Avalailable on line http://www.sei.cmu.edu/pub/documents/06.reports/pdf/06tr008.pdf

Viator, R.E. & Scandura, T.A. (1991). A study of mentor-protégé relationships in large public accounting firms. *Accounting Horizon, Vol. 5* No. 3, pp. 20-30.

Whitely, W. T., Dougherty, T. W., & Dreher, G. F. (1991). Relationship of career mentoring and socioeconomic origin to managers' and professionals' early career progress. *Academy of Management Journal, Vol. 34*. pp. 331-351.

Zey, M.G. (1984). *The Mentor Connection*. Homewood, IL: Irwin.