Preface

Information technology (IT) has been fundamental for improving productivity as well as for the development of knowledge-intensive products and services (Soto-Acosta, Martinez-Conesa & Colomo-Palacios, 2010). Organizations currently use multiple IT/IS solutions to support their activities at all management levels (Trigo, Varajao, & Barroso, 2009). Today, the successful exploitation of IT within the business is dependent upon the availability of IT professionals to design and integrate IT infrastructure and applications (Agarwal & Ferratt, 2002). In this scenario, IT human capital represents a strategic resource for firms, which has the ability to bestow competitive advantages (Bharadwaj, 2000; Wade & Hulland, 2004). Given that a company’s human resources can be a source of competitive advantage that is difficult for competitors to imitate (Kuean, Kaur & Wong, 2010), IT professionals are in the eye of the hurricane of firms assets. Following this trend, Josefek and Kauffman (2003) suggest that the possession of IT human capital distinguishes IT professionals from other professionals. Finally, Beard, Schwieger and Surendran (2010) indicated that the skills and knowledge of IT professionals should prove invaluable in seeking and implementing innovations.

However, this importance reveals a serious threat: the shortage of IT professionals all over the world, which has been pointed out by many works and reports (e.g. Acharya & Mahanty, 2008; Agarwal & Ferratt, 2002; Mithas & Krishnan, 2008). The problem presents two different sources. On the one hand, IT is suffering from the erosion of its student base (Hirschheim & Newman, 2010) because of the low attractiveness of the profession in terms of image (García-Crespo et al., 2008) and status (Day, 2007). According to the analysis by Gartner, many people see computer science profession as an unattractive career option: it is both hard work and “uncool.” (Morello, Kyte, & Gomolsky, 2007). Moreover, IT stereotypes are widely adopted by a large part of society and have been reported in several studies. For example, stereotypes include nerdy/geeky (Gurer & Camp, 2002; Rashid, 2008; Beaubouef & McDowell, 2008; Fisher & Margolis, 2002), anti-social (Martin, 1998), solitary (Craig, Paradis, & Turner, 2002; Rashid, 2008; Beaubouef & McDowell, 2008), unethical (Martin, 1998), snack food and “pizza and coke” eaters (Rashid, 2008; Timms et al., 2008), poorly dressed (Jemielniak, 2007) and men-only (Lavy, 2008; Anderson et al., 2008; Rashid, 2008; Fisher & Margolis, 2002; Durndell & Thomson, 1997) to name but a few.

This bad image of IT professionals can create also potentially serious problems for IT professionals and their employers since IT human resource practices are based on managers’ views (Enns, Ferratt, & Prasad, 2006). In any case, enrollments in computer science university degrees have dropped significantly (Lee & Lee, 2006), causing a severe shortage of new graduates (Allen et al., 2008). According to Pollacia and Lomerson (2006) the decline in the enrollment has declined sixty five percent. On the other hand, lack of career commitment and high turnover rates are threatening IT professional workforce. As
a result of this, the supply of human capital possessing the knowledge and skills needed to exploit IT is falling short and all kinds of organizations around the world struggle to maximize the return from their IT investments (Agarwal & Ferratt, 2001). Moreover, the war for talent (Michaels, Handfield-Jones & Axelrod, 2001) in the IT sector has its battlefield outside and inside the company and the internal recruitment of professionals must be done basing selection requirements in competence evidences. Ang and Slaughter (2004) indicated that recruiting and retaining qualified IT workforce continues to be an important endeavor for many organizations. In fact, a recent survey shows that the second highest priority for organizations and IT managers behind IT-business alignment is how to attract, retain and grow IT personnel (Luftman & Kempaiah, 2007). To conclude, the mismatch of supply and demand is a source of concern for business executives and academics alike (Luftman, 2005).

This situation presents another player: Offshoring outsourcing. Offshoring outsourcing is the practice of distributing work, particularly in the area of information technology services and development to workers outside the national borders of the host country (Niederman, Kundu & Salas, 2006). Not in vain, the Information and Communication Technology (ICT) industry is becoming more global regarding ownership and market scope (Aramo-Immonen, Jaakkola & Keto, 2011). Research indicates that offshoring can create wealth for both the countries and companies involved (Farrell & Agrawal, 2003) but in the other hand, the debate about the possible impact of offshoring services on developed country growth rates, wages, and industrial structure is open (Dossani & Kenney, 2007). Few trends in management in recent years have attracted so much interest as outsourcing and today outsourcing is an indispensable tool in the management of information systems (Leeney et al., 2011). Information systems (IS) outsourcing can be defined as the significant contribution made by external providers of physical and/or human resources, associated either with all components or with IT infrastructure specific components in the user’s organization (Loh & Venkatraman, 1992). The literature situates the beginning of outsourcing in 1991, subsequent to the success achieved by Eastman Kodak with the outsourcing of its IS (Applegate & Montealegre, 1991), followed by other cases such as Continental Bank (Huber, 1993), and BP (Cross, 1995). The focus of IT outsourcing has been changing, since its creation in the 1960s (Loh & Venkataraman, 1995), from a focus on hardware, to software on the 1970s, to hardware and software standardization on the 1980s, and to total solution on the 1990s (Lee, Huynh, Kwok & Pi, 2003).

In the early 1990s, offshoring of software work to development centers in low wage countries pertained to large Western companies such as IBM and SAP who systematically attempted to take a hold of wage differences and resources of a global market (Winkler, Dibbern & Heinzl, 2008). Now, many Fortune 500 companies produce their business information systems in developing countries (such as China and India) to take advantage of their relatively low-cost labor (Sakthivel, 2007) and large telecommunications and software companies have numerous software development groups around the world (Edwards & Sridhar, 2005). However, one of the implications of this situation is the fear of jobs loosing in western countries (e.g. Casey & Richardson, 2008; Casey & Richardson, 2009; García-Crespo et al., 2010). On the other hand, outsourcing and offshoring is here to stay, and IT professionals in developed countries need to adapt to the new world. Not in vain, cultural diversity is influencing software development and its outcomes (Casado-Lumbreras et al., 2011) in both directions.

According to Mithas and Lucas (2010), among high-skill workers, IT professionals who create the IT infrastructure to support critical business processes of firms are particularly susceptible to the forces of globalization. IT related jobs also involve high information intensity and often few requirements for physical presence, these jobs are amenable to global disaggregation and can be performed remotely
or offshore (Apte & Mason 1995). While, reasons like the difficulties involved in transferring tacit knowledge of customers and developers across geographic locations make it necessary to deploy some IT resources onsite (e.g. Espinosa, Delone & Lee, 2006; Ramasubbu et al., 2008).

The result of all these pressures is that IT personnel are experimenting increasing job demands and constraints (e.g. Riolli & Savicki, 2003, Sethi, Barrier & King, 1999; Thong & Yap, 2002). The IT work has been labeled as “stressfull” (Engler, 1998), although this stress is not equally distributed among junior and senior practitioners (Bradley, 2007). The most significant stressors, according to Love et al. (2007), are: work overload, role ambiguity and conflict, career progression, diverse personalities, changing technology, redundancy, limited resources, financial pressures, budget constraints, and so on. Therefore, one of the ongoing concerns among the IT industries is to mitigate the effects of changes in work environment on job satisfaction, work performance, reliability, health and comfort (Rethinam & Ismail, 2008).

In this highly complex scenario, efforts like the International Journal of Human Capital and Information Technology Professionals (IJHCITP) make sense. The objective of this journal is to offer an outlook on the state of the IT profession from the perspective of human capital. IJHCITP includes the different disciplines within the IT field (Software Engineering, Information Systems, Computer Science, Computer Engineering…), focusing on them from the outlook of professionalism and covering the themes applying a multidisciplinary perspective, which includes visions from fields such as human resource management, sociology, psychology and management.

This book is concerned with opportunities and threats for IT Professional working in the 21st century. All these visions are reflected on the first volume of IJHCITP. This manuscript, as a result of a year of works published in IJHCITP, presents four different sections and nineteen chapters.

**SECTION 1**

Section 1, *IT Professionals Human Resource Management*, includes six chapters. Given that human resource management policies and practices on firm performance is an important topic (Huselid, 1995), a section devoted to these practices is timely and relevant. Boxall, Purcell, and Wright (2007) distinguish among three major subfields of human resource management: micro HRM (including recruitment, selection, induction, training and development, performance management, remuneration and union-management relations), strategic HRM (which, according to Lengnick-Hall et al. (2009), covers the overall HR strategies adopted by business units and companies and tries to measure their impacts on performance), and international HRM (that is related to practices operating across national boundaries).

In the case of the book, the first two subfields are covered in the book.

First, Chapter 1 aims to identify technical competency levels relevant to Software Engineering in a spectrum of professional profiles which are found in Spain’s main Software Development companies. Based on a qualitative study of the practices of a set of organizations, and on quantitative analysis based on a survey, Ricardo Colomo-Palacios, Edmundo Tovar-Caro, Ángel García-Crespo and Juan Miguel Gómez-Berbís identify seven consecutive profiles going from Junior Programmer to IT Director.

Chapter 2 is entitled “Human Capital Management Process Based on Information Technology Models and Governance”. In this article, O’Sullivan and Dooley present an approach to applying innovation in any IT based organisation, be it a service department within a larger organisation or a commercial business that generates IT solutions for clients.
Chapter 3, “IT Professionals: An Iberian Snapshot” study empirically investigates which skills are most important for current and future IT personnel based on the perceptions of Iberian (Portuguese and Spanish) CIOs. This paper is authored by António Trigo (ESTGOH - Escola Superior de Tecnologia e Gestão de Oliveira do Hospital, Portugal), João Varajão (Centro Algoritmi and UTAD - Universidade de Trás-os-Montes e Alto Douro, Portugal), Pedro Soto-Acosta (University of Murcia, Spain), João Barroso (GECAD - Grupo de Investigação em Engenharia do Conhecimento e Apoio à Decisão, Portugal), Francisco J. Molina-Castillo (University of Murcia, Spain) and Nicolas Gonzalvez-Gallego (University of Murcia, Spain).

Chapter 4, “Glass Ceilings in Portugal? An Analysis of the Gender Wage Gap using a Quantile Regression Approach” focuses the determinants of gender wage inequality looking for statistical evidence of a glass ceiling effect on women’s wages.

Chapter 5 is entitled “Recruiting, Selecting and Motivating Human Resources: Methodological Analysis and Case Studies Applications” and is authored by Zapounidis and Kalfakakou. The chapter analyses methods and tools used by several enterprises in motivation and in human resources recruitment and selection.

Chapter 6 is the final chapter in Section 1. It is entitled “Human Resource Management on Social Capital”. The objective of the chapter is to develop a conceptual framework for studying the relationship between Human Resource Activities and Social Capital while underlining the importance that human resource policies play in the management of this variable in an IT environment.

SECTION 2

Section 2 is devoted to IT Professionals Education and includes a set of three chapters ranging from seven to nine. The education of IT professionals is facing several challenges in the 21st century: gender misbalance (e.g. Kvasny, Trauth & Morgan, 2009; Rosembloom et al., 2008), race asymmetry (e.g. Goode, 2007; Jackson et al., 2008) or erosion of the student base (Hirschheim & Newman, 2010; Rashid, 2008) to cite just a set of the most important and reported ones. This book tackles some of them in three different chapters.

Chapter 7 by Tokuro Matsuo and Takayuki Fujimotois entitled “Analogical Thinking Based Instruction Method in IT Professional Education”. This chapter describes a methodology and a system design on the intelligent instruction support for software engineering education.

Chapter 8 by Jeffrey Hsu, Karin Hamilton and John Wang presents an approach to bridge the gap between industry and education institutions. The aim is to provide ideas and examples of focused methods and techniques that support the educational outcomes needed by adult students, with a particular focus on IT professionals, relating to new or advanced career placement and the acquisition of useful, practical knowledge.

Chapter 9 closes Section 2. “RSS-Based Learning Using Audio” analyses the use of Really Simple Syndication (RSS) in an educational context and finds that this technology enables new ways of communication to be established between students and teachers while, at the same time, allowing information to be personalised by the users themselves, selecting which educational material they wish to consult.
SECTION 3

Section 3 contains four chapters under the IT Professionals in IT Projects research field. The management of IT projects is a challenging task with many projects failing to achieve their intended objectives (Standing et al., 2006); not in vain, according to Chen, Zhang & Lai (2009) an information technology project is an inherently uncertain investment. In this unstable environment, IT professionals are expected to perform their jobs with a sufficient level of competence but also experiencing rising levels of work-related stress (Love & Irani, 2007). IT projects are the working environment of most of the IT professionals and this section aims to shed some light into this complex setup.

In Chapter 10, Salaheldin Ismail Salaheldin, Khurram Sharif and Maysarah Al Alami present a study on the critical driving and resisting forces that promote or inhibit the implementation and use of project management (PM) software in Qatari Government Organizations.

Chapter 11, “Team Software Process in GSD Teams: A Study of New Work Practices and Models” deals with Global Software Development and its implications for Team Software Process (TSP), one of the leading team-oriented product and process quality initiatives. The aim of the chapter is to assess the difficulty of using TSP in distributed software development environments by evaluating the difficulties for each activity and goal of each role defined in TSP, in order to know the tune that each role needs for global environments.

In Chapter 12, Margarita André Ampuero, María G. Baldoquín de la Peña and Silvia T. Acuña Castillo present a work in which Identification of patterns for the formation of software development projects teams are presented and validated. In their work, a group of patterns that contribute to the formation of software development projects teams are identified through the use of the Delphi method, and of the application of psychological tests and data mining tools. Identified patterns were validated experimentally. This work seems to be the perfect match between psychology and technology, software engineering and management.

The final chapter in Section 2, “Activity Driven Budgeting of Software Projects”, by Baumeister and Ilg, investigates a new activity approach that is based on business specific cost data, which can be easily integrated into existing management accounting systems and applied for software development projects. Besides the presentation of a conceptual design model, this contribution presents a framework for activity driven budgeting and cost management of software development projects.

SECTION 4

Section 4 includes a set of six chapters devoted to shed some light into the work of IT Professionals in Organizations. Since the value of the IT workforce to help organizations survive and excel calls for thoughtful planning and investment (Zwieg et al., 2006), this section will be helpful for both professionals and managers to groom and retain the best IT human capital.

Chapter 14 by David O’Sullivan and Lawrence Dooley is entitled “Collaborative Innovation for the Management of Information Technology Resources”. Being innovation one of the leading challenges in all industries this chapter is important, interesting, and timely. The chapter, after a complete overview of the leading processes of innovation, presents a methodology for applying innovation and a case study of how innovation related knowledge can be managed in any IT organization.
Chapter 15 is entitled “The Organizational Management as Instrument to Overcome the Resistance to the Innovative Process: An Application in the Canary Company” and is authored by Zamira Acosta and Jaime Febles from La Laguna University, Spain. This chapter discusses the management of organizational change as an influential factor in the creation of firm innovation through the implantation of innovative processes. Using a sample of 401 firms from the Canary Islands (Spain), the authors analyze the organizational aspects that could influence the resistance to innovative change and the predisposition to innovation thru the importance that companies grant to environmental variables.

Helena Campos and Luis Amaral (Universidade do Minho, Portugal) present Chapter 16 entitled “GOTOPS: Code of Technoethics Governance”. This chapter focuses on the GOTOPS code of the technoethics (ethical problems raised by IT) governance. Given the importance of ethics in IT field, authors developed a voluntary code of Technoethical Governance for Sustainable Portuguese Organizations (GOTOPS). This code was created to include ethical problems raised by development and utilization of the IT. This code includes Codes of Ethics/Conduct/Practices fully and includes ethical problems raised by development and utilization of the IT.

The work “An eAgriculture-Based Decision Support Framework for Information Dissemination” is presented in Chapter 17. In this work, Armstrong, Diepeveen and Tantisantisom propose an approach to facilitate the acquisition of knowledge for farmer’s decision making processes. The framework comprises data capture, analysis and data processing which precede the delivery of the integrated information for the farmer.

Chapter 18 is “Social Networks and Young People: A Case Study”. In this work, Ferreira analyses some of the most popular social networks. The main characteristics and differences between the “Web 1.0” and “Web 2.0” are explained and, then, the results of the empirical research are presented and discussed. The findings presented in the chapter are particularly relevant for academics and industry professionals who might be interested in the application of new technologies for communication and socialization purposes.

Chapter 19, “Technological Dissemination in the Portuguese Payments System: An Empirical Analysis to the Region of Santarém” is the last chapter of the book. This work, by Sara Pinto and Fernando Ferreira, integrates to what extent payment systems are extended in the Santarém Region, Portugal.

CONCLUSION

The objective of this book has been to draw together on one place a year of articles published in IJHCITP. The four sections of this book delve into some of the most prevalent and pervasive concerns that Information Technology professionals are facing. The book includes chapters from around the world. Each contribution provides an interesting and deep study of one of the main issues on the IT professionals’ practices and scenarios. Enjoy the reading and raise awareness of the skills and circumstances that make IT professionals successful and competitive.

Ricardo Colomo-Palacios
Universidad Carlos III de Madrid, Spain
REFERENCES


ADDITIONAL READING


