IT Professionals and the IT Profession

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Abstract

The context for IT work is changing. New technologies, the trend towards global delivery of IT products and services, the increasing use of social media for work, and the gamification of work have widened job roles in the IT profession. This chapter expands the traditional list of IT job roles (e.g. chief information officer and systems analyst) by identifying emerging IT job roles (e.g. social media specialist and 3D modeler) directly influenced by the changing context of work. Present IT job roles require IT professionals to acquire and develop critical skills in addition to the IT technical and softer skills. These additional skills include cultural competencies and creativity. IT professionals are also expected to polyspecialize in two or more related and mutually reinforcing domains. We conclude this chapter by discussing the implications arising from the evolving IT work context on the jobs, careers and compensation of IT professionals.

Keywords: information technology, professionals, profession, job, roles, compensation, careers, cultural intelligence, gamification, polyspecialist skills.

IT Professionals and the IT Profession

Information technology (IT) professionals are people who acquire, develop or manage IT resources. These IT resources include hardware, software, data and telecommunication networks. IT professionals work in a wide spectrum of IT jobs in one of two IT work settings. IT professionals work in either in IT user organizations or in IT vendor organizations. In IT user organizations, IT professionals provide support for end-user developed systems or concentrate on developing and managing only major, organization-wide applications (Slaughter and Ang 1996). In IT vendor organizations, IT professionals develop and sell IT products and services to IT user organizations (Ho, et al. 2003).

The context of IT work continues to evolve. In past decades, IT work has been shaped by the influences of IT outsourcing (Slaughter and Ang 1996). IT outsourcing has specialized IT job roles, differentiated employment arrangements with the use of contractors and expanded the careers of IT professionals beyond single organizations. In addition to IT outsourcing, new technologies such as social media and new methodologies such as agile development shape the context of IT work. New technologies, the trend towards global delivery of IT products and services, the increasing use of social media for work, and the gamification of work have implications for IT professionals and the IT profession.

The global service delivery model (GDM) refers to the movement of IT products and services across national boundaries (Ang and Inkpen 2008). The GDM aims to provide seamless delivery of products and services by combining the expertise of geographically dispersed IT professionals (Ang and Inkpen 2008, Koh, et al. 2010). Centers of excellence are established around the globe to take advantage of recognized expertise of IT professionals in particular locations at comparatively lower IT labor costs (Koh, et al. 2010). A diverse team of IT

professionals from different cultures work together to design, develop and deliver IT products and services. These IT products and services are for diverse profiles of clients and users from different cultures (Ang and Inkpen 2008).

Among the emerging technologies, several have significant implications for IT work. Some of these new technologies include cloud computing, business analytics, mobile computing, social media, agile development and the gamification of work. We briefly discuss each in turn.

Cloud computing refers to the delivery of data, storage capacity and applications over a network as a service to end users. The term "cloud computing" is derived from depicting complex computing infrastructure as a cloud-shaped symbol in IT diagrams. End users access cloud based applications through a web browser, a thin client system or mobile application; the software and data are stored on servers at a remote location.

Business analytics includes the analysis of "big data" or the large volume of unstructured or semi-structured information generated by Web click-streams, system logs, and other event-driven activities. The goal of business analytics is to develop new insights and understanding of firm performance based on data and statistical methods.

Mobile computing involves taking the computing architecture (i.e., hardware, software and data) out into the field. Computing applications and services are delivered to users using a wireless network on a mobile device. Mobile computing is thought to be one of the key technologies shaping IT work today (Strohmeyer 2011).

Social media refers to the communication between individuals through interactive/digital media on internet and mobile technologies (Cusumano 2011). Social media provides a mechanism for organizations to engage, collaborate with and collect insights from employees and customers. Industry analysts predict that social media will become integral in business

processes that connect with employees and customers. For example, recent research estimates that 21% of IT organizations utilize social media in their IT support (Greene 2011).

Agile development is an increasingly popular software development methodology that is based on iterative and incremental development (Ågerfalk, et al. 2009). Agile development involves the use of techniques such as pair programming, where requirements and solutions evolve through collaboration between self-organizing, cross-functional, small teams.

"Gamification" of work is the use of games and gaming concepts in non-entertainment environments to change user behavior and drive engagement (Burke 2011). Industry analysts predict that 25% of organizations will have one or more “gamified” process by 2015. For example, the gamification of training and development increases mastery and participation levels through status leveling such as awards and merit badges. Gamification also facilitates effective culture interactions through cross-cultural simulations. In these simulations, trainees immerse themselves in realistic critical incidents.

Contemporary Jobs Roles in IT

The evolving context of IT work has further widened the spectrum of IT job roles. Analyses of IT job advertisements (Litecky, et al. 2010, Slaughter and Ang 1996) have identified the following contemporary IT jobs roles and their associated positions:

Information Technology Management. These IT professionals serve as senior IT executives in their organizations. *Chief Information Officers* (CIOs) serve as the most senior IT corporate officers responsible for the IT function within an organization. ClOs offer leadership in managing the information resources of the organization, and in directing the power of information technology toward the strategic objectives of the organization.

Chief Technology Officers (CTOs) are senir IT executives responsible for technology planning, evaluation, and selection. CTOs also set the vision for their organization's IT architecture; and develop and execute their organizations' technology strategy.

Enterprise Architecture. IT is integral to organizations' business processes and to the success of organizations. This recognition has led to the creation of the *Enterprise Architect* job role. Enterprise architects are responsible for defining high level organization-wide IT architecture to couple IT capabilities to business requirements. Enterprise architects are also responsible for seeking opportunities to utilize IT more effectively within their organizations.

Project Management. Successful execution of the GDM requires coordination and control (Ang and Inkpen 2008, Koh, et al. 2010) of a diverse set IT professionals (Joseph, et al. 2010). The increased the importance of project management in managing IT projects in IT user and IT vendor organizations has led to the creation of a the *IT Project Manager* job role. IT project managers organize and manage resources towards achieving IT project targets. Positions in this job role include *project director* and *project manager*.

Sourcing/Vendor Management. IT user organizations are increasingly reliant on IT vendors to provide IT services and support. This increased reliance on IT vendors has led to the creation of the *IT Sourcing/Vendor Manager* job role, IT sourcing/vendor managers are responsible for the governance of one or more IT vendor contracts. They collaborate with IT vendors to provide IT resources to business units within their organizations; and monitor vendors' performance through enforcement of service levels. Positions in this job role include *relationship manager*, *sourcing manager* and *vendor manager*.

Software/Applications Development. These IT professionals plan, design and create software/applications to meet business requirements. IT professionals in this job role may

perform requirements analyses, business processes design and redesign, software/applications testing and quality assurance. Positions in software/applications development include: *database developers, applications programmers and developers, systems analysts and project analysts*.

IT Service Professionals. IT professionals in IT services roles manage the IT information and infrastructure assets. IT service professionals are in a broad range of jobs including database management, data center management and infrastructure support. The job roles of IT services also include network professionals who manage and operate enterprise-wide data communication networks within their organizations. Positions in IT services include *systems administrators*, *database administrators* and *business analytics specialists*.

IT Security. IT security professionals are involved in the design and development of policies and practices to protect IT assets (e.g. information hardware, software, data and network) and IT services from unauthorized access, destruction, or disclosure. Positions in this job role include *IT security architect*, *IT compliance manager*, *network security administrator*.

IT Sales and Marketing Professionals. IT sales and marketing professionals work in IT vendor organizations to market and sell IT products and services. These IT professionals may provide pre-sales consultancy services and post-customer support. Positions in IT sales and marketing include *sales/marketing manager*, *account manager*, *accounts executive* and *pre-sales consultant*.

Emerging Roles for IT Professionals. Emerging technologies and methodologies have created new roles for IT professionals. For example, the glut of big data has opened up jobs such as *Data Scientist* (Strohmeyer 2011). Data scientists are trained to find hidden patterns in unstructured data, such as customer behavior or market cycles. Data scientists can analyze deep

data trends to optimize websites for better customer retention or help identify potential security threats through forensic analysis.

The growing popularity of cloud computing has created opportunities for *Cloud Architects* (Pratt 2012). Cloud architects must be able to understand virtualization and network management, establish and manage private cloud infrastructures, choose and decide on cloud services that should be run internally and which services should be delivered by the cloud on a pay-per-use basis.

Mobile computing has induced strong demand for skills including developing mobile apps, architecting mobile strategies, and securing mobile devices, opening up new jobs such as *Mobile Technology Expert* and *Mobile App Developer* (Strohmeyer 2011).

For IT professionals and the IT profession, the trend towards social media and gamifying work requires dedicated IT professionals in *Digital/Interactive Media* and in *Gaming, Animation* job roles. IT professionals in digital/interactive media job roles design and build secure communication channels and communities of interest. These communities of interest may be within their organizations or between the organization and customers. IT professionals in gaming and animation job roles design and produce digital content that may include interactive communication, gaming, animation, audio and video. Positions in this job role include art director, computer graphics rendering lead, 3D modeler and social media specialists.

Impact on IT Competencies

The current trends of GDM, social media and the gamification of work have expanded the job roles available to IT professionals. These newer IT job roles require IT professionals to acquire and develop additional critical skills beyond IT technical and soft skills (Joseph, et al. 2010, Joseph, et al. 2011).

For example, business analytics requires training and skills in writing scripts to extract and cleanse data, statistics, experimental design, and data visualization. Mobile computing requires familiarity with a variety of mobile devices and platforms as well as the ability to program for mobile platforms. Agile development requires knowledge of the agile unified process and methodologies such as eXtreme programming and Scrum. In addition, soft skills such as the ability to work closely and effectively with project stakeholders are especially important (Ågerfalk, et al. 2009). For example, pair programming requires two developers to work together to code and test an application.

With the GDM, cultural competencies become important (Ang and Inkpen 2008, Koh, et al. 2010). IT products and services are developed for and operate in multi-cultural environments. IT systems are not neutral artifacts. IT systems inherently reflect embedded cultural values and beliefs (Koh, et al. 2010). IT professionals in a globalized work environment, therefore, require an additional competency – cultural intelligence (CQ). CQ is a multi-dimensional competency comprising four dimensions – metacognitive, cognitive, motivational, and behavioral CQ (Ang, et al. 2007). Collectively, the dimensions of CQ that facilitate effective functioning in culturally diverse settings (Ang, et al. 2007).

IT professionals in digital/interactive media and gaming/animation IT job roles are expected to polyspecialize in two or more related and mutually reinforcing domains (Burke 2011). While IT-specific and organization-specific competencies are important (Joseph, et al. 2010, Joseph, et al. 2011), creativity becomes an additional critical skill set. The specific creative skills (Pink 2005) include designing and developing IT systems that engage users' senses beyond its functional form; IT systems that have an underlying "narrative" or a story; and IT systems in which humor and playfulness are integral vales. Creative IT professionals are

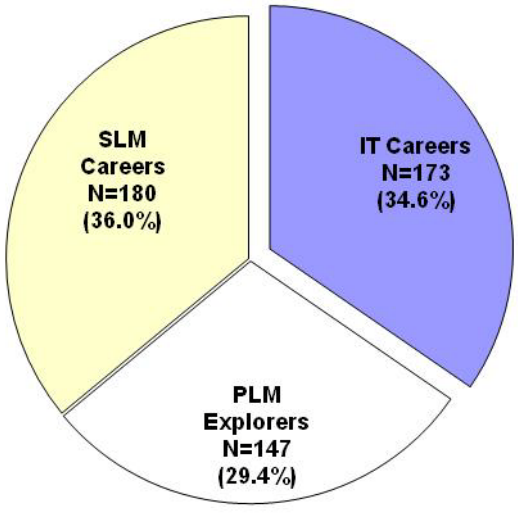
expected to possess the duality of "big-picture" thinking with a focus on details. The incumbent also needs to have a sense of purpose that drives design and the creation of new IT products and services.

Impact on IT Careers and Compensation

The range of IT job roles available to IT professional and broad set of competencies required in these IT jobs have implications for IT careers. Specifically, the polyspecialization of IT professionals' skill sets allows them to hold a varied sequence of IT and non-IT job roles during the course their work life. This sequence of job roles held during the course of one's work life describes an IT professional's career (Joseph, et al. 2012).

Traditional depictions of IT careers portray IT professionals as having two distinct career paths – a technical IT career and a managerial IT career (e.g. Chesebrough and Davis 1983). Contemporary IT careers, however, are more varied than previously thought. Joseph et al. (2012) studied the careers of 500 individuals who had worked in IT during a 28-year period from 1979-2006. IT professional, in their study, clustered into three broad career profiles (Figure 1): (1) information technology (IT) careers; (2) professional labor market (PLM) careers; and (3) secondary labor market (SLM) careers.

Figure 1. Careers of IT Professionals



Within IT careers, individuals in technical IT careers (41% of 173) entered IT early in their careers and held technical IT job for the duration of their careers. Individuals in managerial IT careers (29% of 173) also entered IT early in their careers. Individuals in managerial IT careers held a sequence of technical IT jobs before moving into managerial IT jobs in the latter portions of their careers. These two careers paths conform to traditional depictions of IT careers.

Joseph et al. uncovered a third, previously undocumented, career path in IT careers – the late entry IT career (30% of 173). The late entry IT professionals enter the IT profession from non-IT jobs mid- or late-career and remain within the IT profession thereafter. These IT professionals would have acquired deep domain or non-IT functional competencies that are brought to bear in their IT work.

Joseph et al. also uncovered IT professionals leaving IT profession for either a PLM or a SLM career path. The PLM career path is characterized by a sequence of non-IT jobs in finance, human resources, or general management. These individuals are in IT jobs in the early- or mid-career. These IT professionals are moved to non-IT functional job roles to reap competitive advantages from having a IT-trained employees with deep domain competencies (Reich and Kaarst-Brown 1999). The SLM career is characterized by a sequence of jobs in comparatively lower socioeconomic status roles, e.g. as production operators, providing personal services, or in food and beverage services.

The careers paths described above vary in the extent to which polyspecialist competencies are acquired and developed. Research to date has uncovered pay's relationship with organization-specific and IT-specific competencies. IT jobs requiring higher organization-specific competencies are paid more than IT jobs requiring less domain-specific competencies (Slaughter, et al. 2007). The analyses of pay-organization tenure profiles of IT professionals

show that pay increases with organizational tenure at an increasing rate in IT jobs that require higher organization-specific competencies. But, the pay-tenure profile shows a decreasing rate for those in IT jobs requiring lower organization-specific competencies.

Accordingly, the average pay in managerial IT careers (estimated at $43,629, adjusted for inflation to base years 1982-4; Bureau of Labor Statistics 2004) is significantly higher than the average pay in technical IT careers (estimated at $29,667). The average pay in technical IT careers, in turn, is significantly higher than those of late entry IT professionals (estimated at $24,939). This finding is consistent with other studies of IT salaries. Returns to managerial IT professionals are significantly higher than those of technical IT professionals (Ang, et al. 2002, Slaughter, et al. 2007). Returns to IT specific human capital are also shown to increase with IT work experience (Mithas and Krishnan 2008).

Polyspecialists who choose to leave IT careers for non-IT careers, especially in PLM careers, may be compensated as well or better (PLM: $38,744 at the 75th percentile) than IT professionals (IT: $36,690 at the 75^{th} percentile). But, some ex-IT professionals in PLM careers are less well compensated (PLM: $26,277 at the median; and $17,630 at the 25th percentile) compared to IT professionals (IT: $29,152 at the median; and $21,694 at the 25^{th} percentile). It appears that this latter group of individuals pay a penalty because they have not built significant organization-specific and occupation-specific human capital.

As to be expected, individuals in SLM careers are in job roles where competencies are less valued and abundantly available in a competitive labor market. As such, individuals in SLM careers are paid the least (SLM: $22,938 at the 75th percentile, $18,032 at the median, and $12.310 at the 25th percentile) compared to IT professionals and those in PLM careers.

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