THE INFORMATION TECHNOLOGY WORKFORCE:

TRENDS AND IMPLICATIONS 2005-2008

Prepared for the Society for Information Management by the SIM Advocacy Research Team

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IT WORKFORCE EXECUTIVE SUMMARY

Why Study the Information Technology Workforce?
Paradigm shifts from rapidly changing technological and business environments dictate that IT professionals adjust their skills and capabilities to effectively support their organization's mission. Global IT sourcing, the shift from IT services to business process services, pending baby-boomer retirements and declining IT enrollments in U.S. and European universities are prompting fundamental changes in the nature of IT skills and capabilities available to and desired by both vendor and client organizations. The resulting potential for a mismatch of supply and demand is a source of concern for business executives and academics alike.[1]

To address these concerns, the Society for Information Management (SIM) sponsored research to:
- Understand the current and future needs for IT skills and capabilities in both internal IT departments and IT service providers;
- Determine how organizations are recruiting and developing in-house IT skills and capabilities in 2005;
- Determine the extent to which organizations access IT skills and capabilities through global sourcing in 2005 and 2008; and
- Describe what skills universities should be providing their graduates.

A team of over twenty U.S. and European investigators conducted the research via structured interviews of senior IT managers held from May to October 2005. The respondents were primarily senior IT management from a variety of industries who voiced serious concerns over a number of workforce issues.

Distribution of IT Staffing
At the beginning of the millennium IT staffing levels suffered significantly. The demand for IT workers fueled by Y2K ended, the dot-com bubble burst and a U.S. recession began. In response, organizations began reducing their internal and sourced IT staffing levels; however, recent reports suggest that the pendulum is swinging the other way. This study's results confirm those reports to some extent, showing that the number of organizations adding IT staff exceeds the number decreasing IT staff. However, this picture of IT demand differs from the beginning of the decade. The source of IT talent and the skills IT employers seek in candidates signifies a structural shift in the IT workforce. Related to the distribution of IT staff in 2005 and 2008 among in-house, independent contractors and third-party providers, research results reveal the following:
- The IT workforce, including in-house, independent-contractor, and third-party-provider full-time equivalents (FTEs) will remain basically unchanged from 2005 to 2008.
- Organizations will increasingly use blended sourcing strategies to balance internal IT headcount, resulting in increased opportunities for third-party providers and independent contractors.
- The composition of in-house staffing varies among organizations of different size. For instance, small-medium enterprises (SMEs) anticipate greater increases in internal FTEs than larger organizations.
- SME organizations anticipate greater use of third-party providers and no use of FTEs located offshore by 2008, in comparison to larger organizations that anticipate an increased use of domestic third-party providers, more specifically, those providers with FTEs at offshore locations.
- The overall use of independent contractors is expected to remain relatively unchanged overall; however SME organizations will increase use of independent contractors from 2005 to 2008.
- Baby boom retirements will not be a factor in IT demand or hiring between 2005 and 2008; however for the purposes of succession planning, baby boomers will begin to reach the traditional retirement age of 65 by 2011.

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[1] Attracting, developing, and retaining qualified IT professionals was second of the top five management concerns for 2004 moving up from fourth in 2003. See Luftman, J. "Key Issues for IT Executives 2004," *MIS Quarterly Executive* (4:2), 2005, pp. 269-285. A SIM-sponsored study that investigated the impact of changes in the IS environment on the skills and knowledge requirements of IS professionals, and implications for university curricula provides a base. See Lee, D. M. S., Trauth, E. M., and Farwell, D. "Critical Skills and Knowledge Requirements of IS Professionals: A Joint Academic/Industry Investigation," *MIS Quarterly* (19:3), 1995, pp. 313-340.

IT Skills and Capabilities
In addition to understanding the distribution and sources of IT capabilities, this research explored which skills organizations are seeking from different sources. IT management supplements their in-house staff with sourcing from independent contractors and both domestic and offshore firms. The skills and capabilities identified by respondents as being sourced to independent contractors or third-party providers are technical in nature. The following identifies skills related to sourcers, leaving in house, and critical to retain in house.

- Business skills and capabilities represent five of the top ten skills respondents identified as critical to keep in-house in 2005.
- Project management skills, such as project planning, leadership and risk management were also found in the top ten skills to keep in-house in 2005.
- The remaining two skills found in the top ten are systems analysis and design, both technical but client-facing.
- Six of the ten skills identified by respondents as currently sourced, are also categorized as the least critical to keep in-house, such as system testing and telecommunications.
- The use of a third-party provider to fill a skill demand identified as critical to keep in-house, such as systems analysis and design may indicate difficulty in hiring internally, needed for projects, or to maintain flexible staffing.
- By 2008, technical skills and capabilities will continue to leave in-house, with SME organizations targeting support/helpdesk and telecommunications.
- In contrast to SMEs, larger organizations identified programming as a skill and capability that would leave in-house, presumably to sourcing.
- For the most part, the picture of IT skill and capability needs will not change much by 2008. There is a slight shift from business domain skills to project management skills from 2005 to 2008.

Entry-level Skills
Overall, the data paints a picture of IT managers building an organization of IT professionals who know the industry and business and who can work well with clients and colleagues. However, of significant concern is the apparent divergence between entry-level skills sought by organizations and skills identified as critical to keep in-house, raising questions about how to groom staff from one to the other as they move through the pipeline.

- The majority of respondents indicated that they primarily sought technical skills in entry-level hires. When skills sought in entry-level hires are compared to the skills identified as critical to keep in-house in 2005 to 2008, there is a striking disconnect.
- Communication was identified as the skill most lacking in entry-level hires.
- Typical entry to the IT workforce is from college graduates although many organizations accelerate this process through internship programs, resulting in college graduates that can enter the workforce at a more advanced level, due to the skills and experience acquired during their internship.
- Overall, respondents are not concerned with the supply of entry-level candidates; which may be a result of lower levels of hiring over the past few years and a lack of awareness of diminished IT-related enrollments.

Mid-level Skills
The importance of entry-level positions varies among organizations. Some view these positions as critical to developing skills and capabilities for the future and are investing in employee training; thereby feeding the pipeline and mid-level positions. Mid-level positions are vital for organizations of all sizes and employers plan to hire more at this level than entry-level.

- Project management skills represent six out of ten skills sought in mid-level hires. Systems analysis and design and business-domain knowledge comprised the remainder of the top ten skills.
- Mid-level skills and those identified as critical to keep in-house in 2005 and 2008 are quite similar, yet in striking contrast to the technical skills emphasized by employers for entry-level candidates.
- Analysts, senior systems analysts, and project managers represent the majority of mid-level openings.
- Demand at the mid-level varies based on organizational size, with Fortune 500 organizations expected to hire a larger number of mid-level employees than SME organizations.

- Management is concerned about the supply of mid-level candidates to fill architect, project management and general management positions.

IT Workforce Overview

Managing the IT workforce raises increasingly complex issues for both the public and private sectors. Figure 1 depicts the many forces that IT management must consider to continually improve the workforce. The research focuses on some of the direct relationships posed in Figure 1. However, it does not purport to explore the relationships in depth but it will provide a baseline that can allow deeper investigation in the rich set of challenges faced by structural change in the IT function.

Figure 1 IT Workforce Context
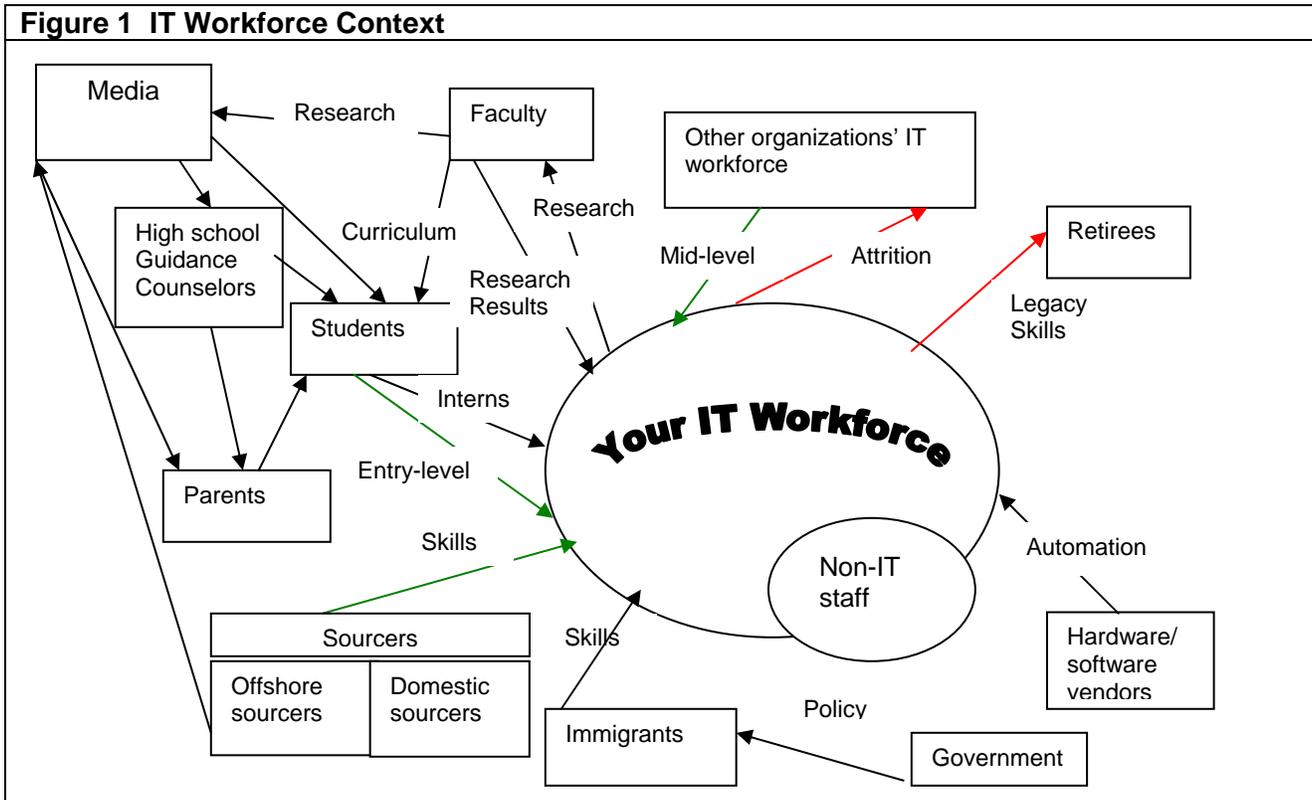
Direct relationships explored in this study encompass the discussion above about the influx of skills from entry-level and mid-level in-house employees, sourcers and loss of skills due to turnover and retirements.

The losses to an organization's IT employee base occur through attrition (voluntary and involuntary) and retirements. In the next ten years retirements pose a concern due to their hold on mainframe/legacy skills which has not been developed through the pipeline.

Depicted in Figure 1 but not investigated in this study are other inputs to an organization's workforce worth noting. Ongoing research is needed to identify the best methods to effectively facilitate the structural change in the IT workforce. Academia can assist IT management by investigating workforce development issues to detect patterns, problems, and identify best practices. The results of faculty research can inform organizations on how to modify their IT human resource strategies, while simultaneously using the information to modify curriculum which can better prepare students for employment. Dissemination of workforce research results to the media as well as academic outlets provides more informed career information.

As seen over the past several years, the media plays a significant role in influencing decision making about career paths and IT work. Media reports of mass layoffs, high unemployment in a particular set of

occupations, as well as the emergence of socio-political issues, such as global sourcing can further complicate the issue by deterring open communication, creating a reactive stance and ultimately hindering comprehension and action. Decision makers, parents, guidance counselors, and students have been influenced by media reports about careers and the IT job market. Academics attribute the media's glorification of the rise of dot.com, its bust and subsequent economic recession and the magnification of offshore outsourcing as detrimental to students' choice of IT-related majors[2]. Additionally, education and training programs are less likely to be supported by any occupation where demand is in decline, in contrast to areas such as healthcare where critical shortages have been identified and highly publicized over the past five years.

Seasoned employees tend to come from other organizations, as well as sourcers already experienced in an organization. Another potential source of supply is found in super-users or liaisons (formal and informal) located in user areas that are effectively IT professionals but report to another department. Some non-IT employees become interested in an IT career after involvement on a project team as seen during Year 2000 compliance activity. Additionally, some organizations have programs that support retraining of staff into IT. Foreign workers seeking US employment are another source of IT talent and often seek employment while enrolled in US higher education. However, government immigration policy has accommodated or decreased the availability of this domestically-educated talent pool depending on the economic and political environment. Use of automated tools from hardware and software vendors can reduce the need for some skills as has occurred in operations.

The value of the IT workforce to help organizations survive and excel calls for thoughtful planning and investment. This research indicates some significant structural changes to IT departments and the role of IT professionals in organizations that senior management needs to take into account to groom and retain the best human capital. It also serves as a call to universities to revise curriculum to meet the changing needs of the market. These issues are explored in greater depth in the concluding section of this report; however principally they consist of a two-prong strategy of outreach and investment.

Outreach:
- Provide meaningful information to K-12 guidance counselors and educators, parents, and college faculty in order for them to advise students appropriately on IT career paths and opportunities.
- Provide meaningful information and resources to IT practitioners related to the structural changes in the IT workforce to help them invest in their own skill attainment.
- Improve and expand public-private collaboration to dramatically increase awareness of students regarding the opportunities in IT and the change in skill requirements, for example from technical to business skills and between in-house versus sourced staff.

Investment:
- Increase action-oriented solutions related to improving K-12 student preparation, specifically in math and science.
- Improve and align university curriculum with critical skill demands.
- Support research in order to understand the potential impact of these changing skill demands on the IT workforce. Using the knowledge gained via this research, create and implement workforce development programs that support IT professionals during employment transitions and promote career progression to meet changing skills demands.
- Review IT workforce pipeline gaps to determine transition points where grooming from lower levels and/or training for different skills are needed to retain critical skills in house.

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[2] George, J., Valacich, J., Valor, J., Does Information Systems Still Matter? Lessons for a Maturing Discipline, *Communications of the Association for Information Systems*, 16 (8), 219-232, 2005.