

Occupational and Career Outlook for MIS Majors 2012-2018

Ken Laudon
New York University
Stern School of Business
2011

Total employment in the United States is expected to increase by about ten percent from 2010 to 2018. However, the 15.3 million jobs expected to be added by 2018 will not be evenly distributed across major industry and occupational groups. Changes in consumer demand, improvements in technology, the rise and fall of industries and entire sectors of the economy, and many other factors, will contribute to the changing employment structure of the U.S. economy. Employment growth in IS/MIS jobs will be about 50% greater than average job growth in other fields.

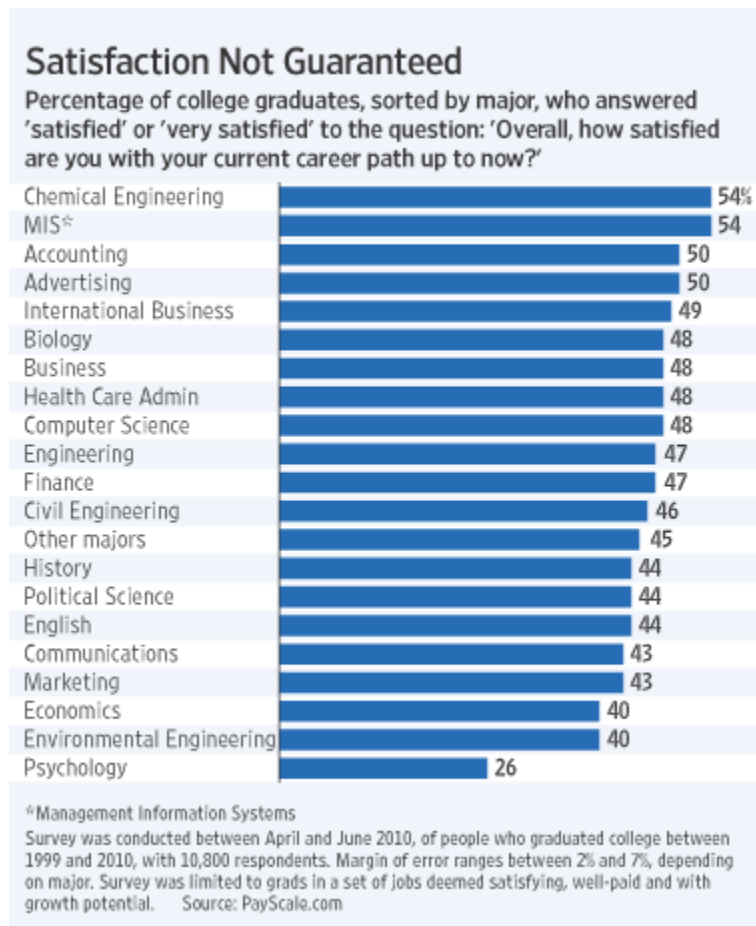
Career Satisfaction Among Information Systems Majors

A survey completed in 2010 found that MIS majors were among the most satisfied with their career path since graduation when compared to other majors (Figure 1-1). In fact, MIS majors had the highest level of career path satisfaction. 54% of MIS graduates were "satisfied" or "very satisfied" with their career path since graduation. The survey, which was conducted by PayScale.com between April and June of 2010, only included respondents with jobs, but could also include people who went on to earn a graduate degree. It included 10,800 employees who got their bachelor's degrees between 1999 and 2010. The survey was done as part of the *Wall Street Journal's* Paths to Professions project, which looked at jobs that are satisfying, well-paid and have growth potential. The PayScale survey examined people in a set of jobs that included industries such as health care, finance, and government.

The differences in satisfaction among the top half of college majors reported in the study are not huge, but they are interesting and statistically significant. The average for all careers is 46%. It is likely that those college majors with less than "average" satisfaction reflect difficulties in finding jobs in a field for which they have trained, and when found, retaining jobs and having good job experiences. Psychology had the lowest level of satisfaction.

Another factor in explaining the different career satisfaction levels among college graduates is pay. MIS is ranked 15th out of 114 occupations in terms of median starting pay (\$50,900) and mid-career median pay (\$90,300) (Payscale.com, 2010).

Figure 1-1 MIS Scores Highest in Career Path Satisfaction



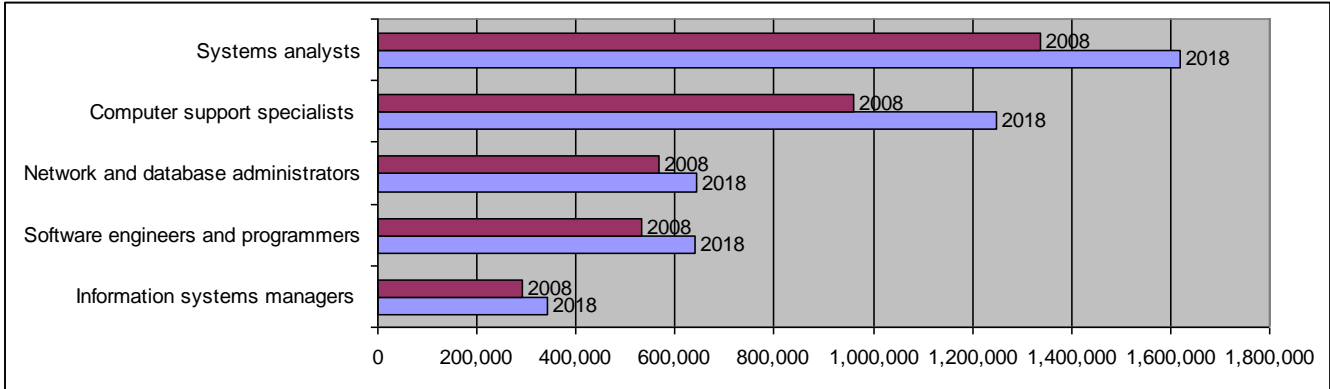
MIS Job Projections to 2018

If MIS college graduates today are among the most satisfied, and if this is in part related to employment prospects and job satisfaction after graduation, then the future for the various IS/MIS careers is quite positive because jobs in MIS are expected to continue to expand over the next eight years at a healthy rate. IS employment in the United States is projected to grow by about 1 million jobs in the forecast period to 2018.

Figure 1-2 presents data from the Occupational Outlook Handbook (Bureau of Labor Statistics, 2011) for the period 2008-2018. This table collapses a wide variety of MIS

occupational titles into five major categories: IS managers, systems analysts, computer support specialists, network and database administrators, and software engineers and programmers. Figure 1-3 describes the projected percentage change and salary range in these occupations over the forecast period.

Figure 1-2 Job Outlook for Selected IS Occupations 2008-2018



Source: Bureau of Labor Statistics, 2010. Table by author.

Compensation of IS Personnel

IS occupation salaries are generally far above the average compensation for employees in the United States (about \$45,000 annually) (Figure 1-3).

Figure 1-3 Percentage Change and Salary Range in Selected IS Occupations, 2008-2018

	%Change	Median Salary	Salary (middle 50%)
Information systems managers	17%	\$112,000	\$88,240 to \$141,890
Software engineers and programmers	20%	\$85,000	\$67,790 to \$104,870
Network and database administrators	14%	\$66,000	\$51,690 to \$84,110
Computer support specialists	30%	\$43,000	\$33,680 to \$55,990.
Systems analysts	21%	\$75,000	\$58,460 to \$95,810

Source: Bureau of Labor Statistics, 2010. Table by author.

Information system managers have a median salary of \$112,000; software engineers and programmers, \$85,000; network and database administrators, \$66,000; computer support specialists, \$43,000; and systems analysts, \$75,000. The highest paying IS occupations are IS managers (\$112,000), software engineers (\$86,000), and network and database administrators (\$66,000). About 260,000 new jobs are expected to develop in these areas by 2018. Students of MIS with a managerial interest will find significant opportunities in project management, system management, and liaison roles with other corporate managers in marketing and sales, production, general administration, and finance. Students with an interest in database, data mining, networks and software development will also find significant opportunities.

Fastest Growing IS Occupations

All IS occupations show a far higher rate of growth than the average for all occupations (about 10%). The fastest growing occupations are computer support specialists (30%) followed by systems analysts (21%). The other IS occupations are roughly in the 15%-20% growth range in this ten-year period, roughly 50% faster growth than the average of all occupations.

The fastest growing occupations in the IS field are systems analysts and computer support specialists (Figure 1-4). Each is expected to produce about 300,000 new jobs by 2018. These are excellent entry-level jobs for recent graduates, and offer many opportunities for advancement to higher paying IS jobs in the future. Computer specialists tend to be more technically oriented, whereas assistant (entry level) systems analysts tend to be more management oriented. Computer support specialists provide technical assistance and advice to company employees, and customers, as well as provide training materials. Systems analysts provide a crucial link between business managers and systems staff by helping managers to define information requirements, system design, and implementation. Both of these occupations require good technical, interpersonal, and problem solving skills. Systems analysts require, in addition, excellent writing and presentation skills.

Figure 1-4 Number of New Jobs for IS Occupations

	2018	2008	New Jobs
Computer support specialists	1,247,800	961,200	286,600
Systems analysts	1,619,300	1,336,300	283,000
Software engineers and programmers	640,000	532,200	107,800
Network and database administrators	643,000	565,700	77,300
Information systems managers	342,500	293,000	49,500

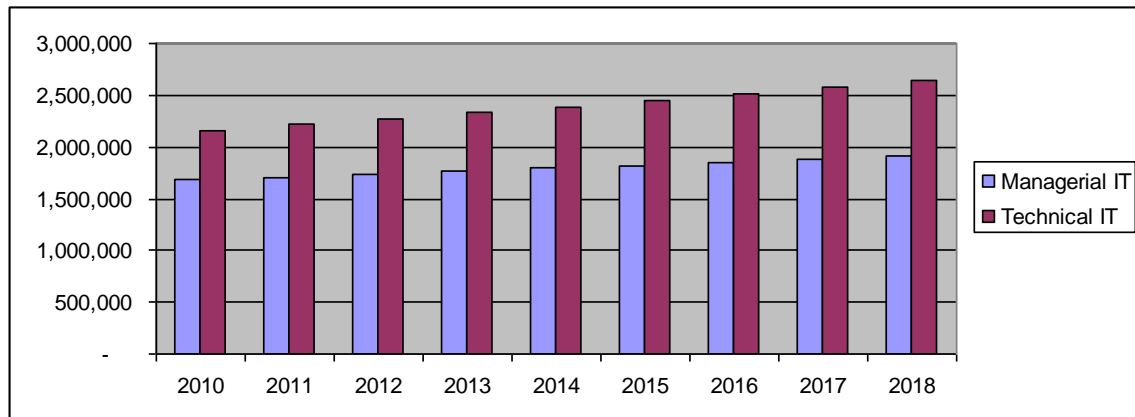
Another 230,000 new jobs for software engineers and programmers, network and data base administrators, and information systems managers are expected to open by 2018.

Technical vs. Managerial IT Jobs

One question business students often ask is "How much technology do I need to know to get a good job?" Unfortunately, there is no single answer for this question. From a career perspective, what is better: start out with a strong technology background, and then build on those skills and experiences, seek out additional educational credentials, and seek a higher paying management position? Or, is it better to focus on the management skills while in school, apply for management-oriented IS jobs, and learn a smattering of technology along the way?

Figure 1.5 groups the various IS occupations into two groups: managerial and technical. Managerial occupations include information systems managers and systems analysts. Technical occupations include computer support specialists, software engineers and programmers, and data base administrators. From what we have said so far, it's clear that the technical jobs are more numerous to begin with and are generating slightly more jobs than the managerial occupations, and that the managerial occupations pay more than the technical occupations on average. Figure 1.5 illustrates that technical IS jobs are more numerous and are growing a bit faster.

Figure 1.5 Technical vs. Managerial IT Jobs



Note: Technical jobs: computer support specialists, software engineers and programmers, network and data base administrators. Managerial jobs: information systems managers, and systems analysts

In the history of the MIS profession there are a variety of successful career paths. Some senior IS managers started out in narrow technical jobs and worked their way up to becoming managers and even CIOs (Chief Information Officers). In contrast, there are some CIOs who have very little technology background but a great deal of experience as project managers, dealing with other senior managers, and managing at the Vice-president level in other divisions of the company. However, this latter case is rare. Chances are in the first interview students have with potential IS/MIS employers, the question of technical competence will come up. Therefore, it is wise for recent college graduates seeking employment in the IS/MIS field to have a good to strong technical background.

One career strategy is to focus on developing technical skills while in school and then use those skills to obtain an entry-level job. Return to school, or learn on the job, managerial skills to participate in the higher earnings of this group. Another strategy is to focus on technical skills for an entry level job, then build on those skills staying within the technical track to higher paying positions.

The optimal career strategy is arguably a mix of strong technical skills with an equally strong set of interpersonal, collaboration, and management skills. If you can't get along with colleagues, have poor project management skills, and are poorly organized in your work, chances are good your technical skills alone may not be enough for a successful career.

The Impact of an Aging Labor Force on IS Careers

The demand for IS and MIS employees will actually be much higher in the next decade and beyond than discussed above because of the aging population and labor force in the United States. The U.S. civilian population, including individuals aged 16 and older, is expected to increase by 25.1 million to a total of 325 million from 2010 to 2018 (about 8%). The labor force is expected to increase at about the same rate from 157 million in 2010 to 167 million in 2018, an increase of .8% a year, down from greater than 1% in previous decades. Labor force growth is slowing.

As the baby boomers continue to age, the 55 and older age group is projected to increase by 29.7 percent, more than any other age group. Meanwhile, the 45 to 54 age group is expected to decrease by 4.4 percent, reflecting the slower birth rate following the baby-boom generation. According to the U.S. Census Bureau, the number of people aged 55 and older will increase to 73% by 2020, while the number of younger workers will grow only 5%. By 2030, with the last of the baby boom generation turning age 66, an unprecedented 20% of the population will be over age 65. Workers aged 55 years and older are anticipated to leap from 18.1 percent to 23.9 percent of the labor force during the same period. As baby boomers grow older, so does the U.S. workforce.

In a nutshell, the U.S. population and the labor force are getting older over the foreseeable future, and slowing in growth. Three decades ago the median age of the labor force was 35 years. Today, the median age is estimated to be 41 and by 2030, the median age is expected to be 48. Retirement age had been falling since the turn of the century (from 74 years down to 62 years), but going forward to 2018, more elderly workers will remain in the labor force and average age at retirement is expected to increase to 67 (for a variety of reasons including better health, extension of the legal age of "full retirement" by the Social Security Administration, and economic necessity). Beginning with people born in 1938 or later, retirement age has gradually increased until it reaches 67 for people born after 1959.

So far we have been using projections for new openings in the IS field. These projections do not account for replacement positions for those retiring. The number of replacement positions is not known for the specific IS field, but overall in the labor force, about 25% of today's labor force will retire in the years 2010-2020. Using this ratio and applying it to the IS field suggests actual job growth will be 25% higher than suggested by looking just at "new positions." This means the IS field will actually add about 1.25 million new jobs in the period 2010-2018.

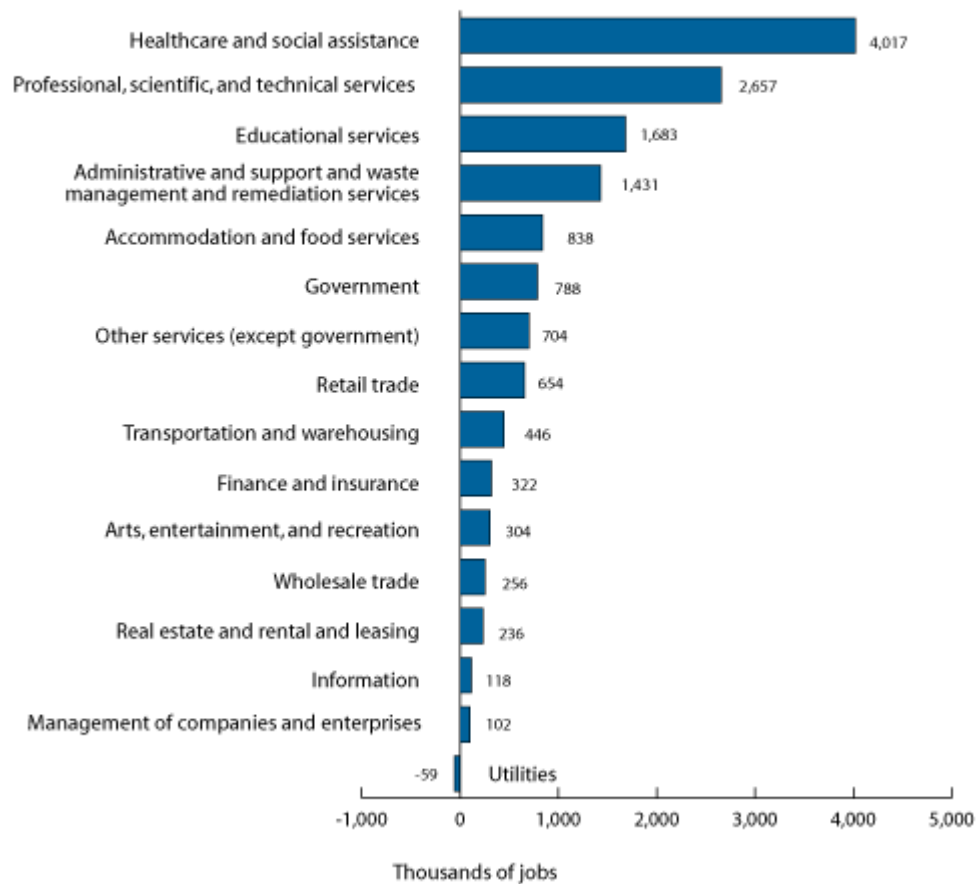
Industry Effects: Choosing The Right Sector

While employment prospects for IS/MIS majors look very good, it certainly will help if students focus on those sectors and industries that are likely to expand. The shift in the U.S. economy away from goods-producing in favor of service-providing is expected to continue. Service-providing industries are anticipated to generate approximately 14.5

million new wage and salary jobs. As with goods-producing industries, growth among service-providing industries will vary (Figure 1-6).

Figure 1-6

Numeric change in wage and salary employment in service-providing industries, 2008–18 (projected)



Source: BLS National Employment Matrix

Choosing the right industry for employment is like choosing the right asset class in an investment portfolio. The best opportunities for IS employment both in terms of percentage growth and overall numbers of new jobs can be found in healthcare, professional and scientific services, and educational services. In general, employment in the manufacturing sector is not expected to grow as fast as service sector employment although there are local exceptions.

The Impact of Outsourcing on IS/MIS Employment: A Riddle

In the last decade, tens of thousands of IS/MIS jobs in the United States have been outsourced to India, as well as other countries. The three leading Indian outsourcing firms (Wipro, InfoSys, and Tata) are growing at about 12% annually, and currently employ about 300,000 IS/IT workers in India, most of whom are working on outsourced projects from the United States and Europe. Large American global technology firms like Cisco, Microsoft, and IBM have made significant investments in India. IBM has created seven centers in India, and will employ over 150,000 Indian workers by 2012. Microsoft has over 5000 employees in India working on products at all stages of the lifecycle from research and development to support services. Cisco has 7,000 employees in India. Accenture, one of the world's largest IT and business consulting firms, has a large and growing practice called "business process outsourcing" and "management outsourcing," and has over 74,000 employees in India working diligently to encourage firms around the world to outsource to India, or other low-wage countries.

There are many reasons that outsourcing to India and other areas has grown so rapidly. Labor costs in India are 10%-20% of labor costs in the U.S. A \$60,000 a year programmer in the United States can be employed in India in 2010 for about \$6,000-\$8,000, and that programmer will live comfortably. Second, the Internet has made it possible and inexpensive to coordinate and manage far-flung teams of employees. Third, Indian infrastructure has improved to the point where it can support global business operations (although there are exceptions). Fourth, India and China with 1 billion+ populations and nearly 10% annual GDP growth rates represent significant investment opportunities for American and other global firms. Most investments in China are not made for their outsourcing potential, but for the chance to participate in the growth of China's domestic and export markets. In their own right, India and China are economies that will grow twice as fast as the U.S. economy in the next decade.

All of this outsourcing would seem to paint a dim picture for IS/MIS careers in the United States. One would expect thousands of IS/MIS workers to be out of a job, and investment in systems to shrink. Oddly, after a decade of significant outsourcing, unemployment among American IS/MIS workers is half that of the labor force average of 9.5% in the depths of a recession, and is lower than unemployment among all college graduates and professionals of similar educational levels (about 6.2%) in the height of the recession 2010. Investment by U.S. businesses in information technology and systems has expanded in the last decade at an extraordinary rate of about 5% annually (more than twice the rate of growth of the economy as a whole). Investment in information technology, systems, hardware, software and telecommunications equipment was \$562 billion in 2008, 52% of all capital investment in the U.S., and up from \$366 billion in 1998 (Bureau of Economic Analysis, 2010). Employment levels in the IS/MIS careers and occupations have also expanded in the United States over the last decade at about 5% annually.

How is it possible that IS/MIS outsourcing can be proceeding at such a rapid rate, and growth in IS/MIS careers and investments can be expanding? The answers are speculative. One possible answer is that outsourcing has largely involved lower level, technical programming and engineering jobs and not higher level, high value-added jobs. As more lower-level jobs are outsourced, higher-value jobs are used to replace them. Moreover, the demand in the United States for technical programming jobs has exceeded the supply, leaving plenty of work for local U.S. technical personnel. Some jobs like technical support specialist cannot easily in most circumstances be outsourced. Higher level management jobs are much less likely to be outsourced because of the need for face-to-face interaction with suppliers, customers, and employees. Sales and marketing are difficult to outsource. Another possible explanation is that the growth of outsourcing has potentially lowered the costs of system development in the United States, making systems less expensive to build, and therefore encouraging U.S. firms to invest more in IT/IS and systems in general. The cost of technology has also fallen significantly (in terms of cost/MIP). These developments are the equivalent of lowering the price of capital (in this case IT capital). And high levels of IS investment in the United States have only encouraged more outsourcing (as well as domestic employment). One result is a virtuous circle: outsourcing leads to lower system development costs, which leads to more investments in systems, which leads to higher demands for skilled IS/MIS labor, some of which will be outsourced. There are of course brakes and limits on the outsourcing process which are beyond the scope of this paper.

Summary: Employment and Career Prospects for IS/MIS Majors in 2010-2018

- Recent college graduates report high levels of satisfaction in their IS/MIS careers.
- US IT/IS jobs are expected to grow at 5-6% over the period, about 1.5 times the GDP growth and considerably faster than the overall growth in the labor force.
- Compensation for IS/MIS graduates is above the average compensation for college graduates and is likely to remain so for the forecast period.
- The fastest growing IS/MIS jobs are computer support specialists and systems analysts.
- The highest paid IS/MIS jobs are information systems manager and systems engineers, followed by network and data base administrators.
- Technical vs. managerial jobs. Technical jobs show large percentage and absolute growth, but managerial jobs pay more, and are far less likely to be outsourced.
- Both technical and managerial knowledge and skills are valued in the marketplace.
- It helps to choose the right economic sector when preparing for the job market. Healthcare, professional, and educational services show the highest sector growth rates over the next ten years.
- Outsourcing has had a significant impact on IS/MIS employment and investment in the United States although not in the ways commonly believed. Outsourcing has not led to massive unemployment or under-investment in U.S. IT infrastructure. On the contrary, outsourcing may have led to more systems development and more employment than otherwise might have occurred.
- Technical jobs which can become routinized and commoditized suffer the greatest risk of outsourcing to low wage countries.

- Managerial jobs, and those technical jobs which require hands-on, judgmental, creative, and design skills are much less likely to be outsourced.
- The number of jobs outsourced to India will most likely expand at about 10% annually.
- Future growth in the United States will be driven by falling capital costs in the IT/IS sector, more powerful hardware and software, and relatively stable IS/IT wage rates.