

Salary Trends of Information Technology Managers

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Abstract

Rapid job growth in the information technology (IT) field has created a supply and demand imbalance for highly skilled professionals. This shortage of IT workers exists in virtually every major business sector. Sectors that are most affected by this problem include the financial, retail, manufacturing, service, entertainment, and transportation industries. To cope with this problem, companies and organizations are offering more lucrative salaries and a wide variety of incentive programs to attract and to retain highly skilled IT workers. While it is true that the economic downturn has affected the steady rise in salary trends, recruitment and pay packages will become critical issues again given the projected mass exodus of governmental information technology workers in the coming years. This study examines the national and regional salary trends of IT professionals. Specifically, the salaries examined are for the years 1991 through 2000. The IT jobs examined are all management related. The results of this study should be helpful to human resource administrators, IT consultants, career counselors, IT staff recruiters, corporate budget managers, executive placement agencies, temporary job agencies, IT analysts, and economic forecasters. Individuals working with governmental agencies such as the Department of Labor, the Immigration and Naturalization Services, and labor attorneys will also find this study useful. Finally, computer science as well as information systems graduates, students, and faculty should find the results of this study beneficial for making career and curriculum related decisions.

Keywords: Information Technology, Managers, Salaries, Pay, Compensation

1. INTRODUCTION

To Information technology (IT) has emerged as a fundamental driver of global business and economic growth. This explosive growth in job creation has led to the massive demand for IT workers ("The Digital Work Force", U. S. Department of Commerce 1999). While it is true that this shortage of IT workers exists in virtually every major business sector, more IT dependent industries including financial institutions, software developers, Web-based retailers, manufacturing, telephony services, on-line entertainment, and transportation companies are especially affected.

There are a variety of good reasons to have a career in the IT industry. It is a career path that has almost unlimited advancement potential. Nearly every company, from the individual owned software design venture to the biggest manufacturer of home furnishings, all categories of skilled IT workers are needed to keep the business running smoothly. As long as the IT worker is willing to participate in continuous professional development, that person can easily move from one company to another, from one industry to another, and climb the corporate ladder.

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Obviously, one of major reasons to select a career in the IT area is financial. Many IT jobs are known for "... high salaries, ... great benefit, including stock options ... and much more. All this may sound like a dream, but for the highly skilled information technology workers, it's now a reality..." (Ruhan 2000, p. 24). As a matter of fact, it is common to read in popular magazines about young and successful IT professionals who have pursued their dreams in the IS world and become millionaires. Many of their employees, including secretaries, have also become wealthy individuals in a relatively short period of time because of their companies' success. Many of these incentives do not exist or are just much less lucrative in non-IT jobs. For example, the salary of IT workers with the hottest skills has been increasing by more than 10 percent per year. On the other hand, non-IT salaries have only soared by about 4 percent per year. (Hansen 2000).

Even among the IT industry, the financial compensation can be quite diverse. While it is true that like in other industries, rank, seniority, and years of service are compensation factors, a lot of the pay differences are related to the type of job classifications and the degree of shortage in the market for persons with that type of skills. For example, persons in key IT positions have been increasing at an annual rate of about 13 percent (Cole 1999). However, different categories of IT jobs can also be compensated in accordance with other market factors. A few of the examples pertaining to the different total pay raise compensation distributed to IT workers from the period 1999 to 2000 are presented below (Hansen 2000):

Selected Category of IT Professional	Annual Pay Raise
Network Engineers	9 percent
Systems Administrators	10 percent
Operating Systems Managers	13 percent
SQL Administrators	8 percent
SQL Developers	10 percent

As can be seen from the Table above, the annual pay raise differential can be relatively large. However, it is important to point out that these average numbers only apply to persons with only one primary job skill. Individuals can always increase their marketability and pay raises by acquiring multiple job skills. In fact, a couple of studies have actually found that more and more IT companies are advertising jobs that required multiple job skills because it can have a profound effect on their corporate skills inventory (MacClaren 1999; Markey, Liu & Koong, 2000; Koong, Liu & Liu, 2002).

2. STATEMENT OF THE PROBLEM

Virtually every segment of the global economy has embraced information technology as the means for improving their business functions and processes. The ubiquity of IT can be seen almost in every job in the

new economy. In many industries, the number of workers needing to use a computer at their jobs alone can range from 50 to as high as 85 percent ("The Digital Work Force", U. S. Department of Commerce 1999).

As a result of the proliferation of IT in the workplace, the demand for highly skilled IT workers have greatly increased in recent years. Some of the more known and published statistics about this increase in job creation and the associated outcomes are presented below ("America's New Deficit", U. S. Department of Commerce 1998; "The Digital Work Force", U. S. Department of Commerce 1999; Greenberg 2000; Ruhan 2000; Thibodeau 2000a; Thibodeau 2000b).

- According to International Data Corporation, in the new millennium, about 800,000 IT positions are estimated to be open in the U. S alone. This number represented roughly 20 percent of the total workforce.
- The Bureau of Labor Statistics projected that 5.6 million people will be needed to fill new IT positions and replace IT workers who are leaving as a result of retirement, change of professions, or for other reasons by 2006.
- The Fordyce Letter, a monthly newsletter for headhunters, indicated that about 10 percent of the openings in IT were unfilled at any one time.
- In 1995, the federal government's entry salary for IT workers with an undergraduate degree was between \$18,700 to \$23,200. However, the average starting salaries in the private sector was about \$34,000 more that year. Faced with high turnover rates, the federal government made a salary adjustment of 7 to 33 percent for their IT workers in 2001. That initiative was aimed at enhancing the government's ability to recruit and retain employees.

While it is true that the economic downturn in the last year has greatly affected the demand for IT workers, the 18-month industry slide has likely hit rock bottom (Marsan 2002). In addition, the government is facing a mass exodus of IT workers because federal workers are eligible to retire at age 55 and 29 percent of all governmental IT workers are over the age of 50. The Defense Department is already trying to recruit and retain top staffers by beefing up bonuses (Anthes 2002).

Overall, the imbalance between the supply and demand for skilled IT professionals have resulted in the need for rapidly rising salaries as well as other incentive programs to attract and to retain desirable employees. To corporate managers of smaller firms, governmental recruiters, and administrators in non-profit organizations, this can be a nightmare. More and more highly skilled employees are being lost to competitors and larger firms that are offering better compensation packages. The reality is, as one recruiter puts it "...if we're not paying competitive rates, of course we're going to lose people..." (Tristram 1998, p. 64).

3. STATEMENT OF THE OBJECTIVE

According to economic theory, the equilibrium price of a product or service is determined by supply and demand factors. In the area of salary negotiation, that determination can be quite complex. A variety of market factors such as job location, rank, and years of service can greatly affect salary compensation. A question that haunts employers and prospective employee is what is the right salary (Dubie 2000; MacClaren 1999)? To the employers, offering a salary that is not competitive could mean losing the candidate to a competitor. To the employees, accepting a lower salary can have additional long-term implications because retirement packages and other compensation benefits are often tied to salary figures.

A solution to finding the right salary that may satisfy both parties is to have access to national and regional salary information that can provide the basis for offer and counter offers between employers and employees. Such information and trend data can also greatly help both parties to arrive at a mutually acceptable salary decision.

This study examines the national and regional salary trends of IT professionals. Specifically, the salaries examined are for the years 1991 through 2000. The IT jobs examined are all management related. The results of this study should be helpful to human resource administrators, IT consultants, career counselors, IT staff recruiters, corporate budget managers, executive placement agencies, temporary job agencies, IT analysts, and economic forecasters. Individuals working with governmental agencies such as the Department of Labor, the Immigration and Naturalization Services, and labor attorneys will also find this study useful. Finally, computer science as well as computer and management information systems graduates, students, and faculty should find the results of this study beneficial for making career and curriculum related decisions.

4. DATA GATHERING

Data for this study was obtained from the DataMasters organization. Founded in 1971, the mission of DataMasters is to provide support for all areas of information systems to both large and small companies with their IT projects. DataMasters is affiliated with National Computer Associates, an international network specializing in the recruitment and placement of information systems professionals.

One of the complimentary services provided by DataMasters on its Web site is the annual computer industry salary survey report. All the annual computer industry salary survey reports for the period 1991 through 2000 can be obtained by accessing the Web site of this company at <http://www.datamasters.com/survey.html>. The data is

provided as a service to the profession "to enable employers and candidates to evaluate their own compensation situation." (2001 Computer Industry Salary Survey, 2001). The actual survey was conducted by Dowden & Company, a compensation research firm based in Pennsylvania. Salary figures reported were based on geographic locations. The five geographic locations are (a) Northeast, (b) Midwest, (c) Southeast, (d) Southwest, and (e) West Coast.

Two broad categories of IT salaries are contained in each of the annual salary reports. The two major categories are management level and professional staff job titles. In accordance with the primary objective stated in this study, the data extracted includes only management level job titles. Three salary figures were reported for each of the job titles listed. The figures reported include median low, region median, and median high. For the purpose of consistency and to better represent the outcomes in the data set, the region median figures were the only numbers selected for analysis.

For the period 1991 to 1992, there were 8 job titles that fall under the category called management level. This list was expanded to 11 job titles in 1993. The job titles examined are (a) CIO/Vice President (CIO/VP), (b) Information Systems Director (ISD), (c) System Analysis and Programming Manager (SAPM), (d) Technical Support Manager (TSM), (e) Network Manager (NM), (f) System Analyst/Programmer/Project Manager (APPM), (g) Database Administration Manager (DAM), (h) Telecommunications Manager (TM), (i) AS400 Manager (AS400M), (j) Data Center Manager (DCM), and (k) PC Work Station Manager (PSWST).

5. METHOD OF ANALYSIS AND PRESENTATION

Two mathematical measures were used to analyze the trend as well as the magnitude of the changes during the ten-year period. Index was selected for showing the long-term behavior of the data set because this mathematical tool allows the use of a base year for assessing longitudinal changes. In this study, the base year selected was 1991, if data is available that year. In four of the cases, the data was only available in 1993. That is the reason why the base year for those job titles have that as their base year.

Percentages were used to show the short-term behavior of the data set because this tool allows the measurement of change between two immediate periods. Major fluctuations between the immediate periods observed can easily be detected using this tool.

Five tables were formulated to show the outcomes of this study. Information about the detail set used was presented in the first table. The next two tables were

used to show the salary trends of the various job skills at the national level. The last two tables contained salary trends of the different job skills at the regional level.

6. FINDINGS

The management related IT jobs can be classified into 11 type of job skills or titles. Four of the job titles did

not have salary figures until 1993. They were Network Manager, AS400 Manager, Data Center Manager, and PC Work Station Manager. In one case, one of the skills appeared to have become obsolete in the year 2000. That job title was AS400 Manager. Detail information about the data set used is presented in Table 1.

Table 1 Data Availability

Job Titles	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
CIO/VP	A	A	A	A	A	A	A	A	A	A
ISD	A	A	A	A	A	A	A	A	A	A
SAPM	A	A	A	A	A	A	A	A	A	A
TSM	A	A	A	A	A	A	A	A	A	A
NM	N/A	N/A	A	A	A	A	A	A	A	A
APPM	A	A	A	A	A	A	A	A	A	A
DAM	A	A	A	A	A	A	A	A	A	A
TM	A	A	A	A	A	A	A	A	A	A
AS400M	N/A	N/A	A	A	A	A	A	A	A	N/A
DCM	N/A	N/A	A	A	A	A	A	A	A	A
PCWST	N/A	N/A	A	A	A	A	A	A	A	A

Notes: [A] Available [N/A] Not Available

The National Index Growth of IT Management Level Salaries for the period 1991 through 2000 are presented in Table 2. Using 1991 as the base index, or 1993 in the

case of those four job skills that did not have salary figures collected until then, there are several very interesting trends about the salaries of IT Managers.

Table 2 National Index Growth of IT Management Level Salaries: 1991-2000

Job Titles	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	Average
CIO/VP	100	100	105	106	116	122	129	144	154	167	2.4
ISD	100	101	105	110	117	124	132	143	153	164	2.5
SAPM	100	103	106	115	121	128	132	145	154	164	2.7
TSM	100	103	97	107	114	120	124	134	142	151	1.9
NM	N/A	N/A	100	105	112	118	122	130	141	153	2.3
APPM	100	103	104	108	114	120	125	135	145	156	2.1
DAM	100	100	101	105	113	114	122	132	145	158	2.4
TM	100	102	102	104	111	116	122	132	141	152	1.8
AS400M	N/A	N/A	100	104	112	118	123	132	142	N/A	1.9
DCM	N/A	N/A	100	102	108	113	121	129	136	143	1.9
PCWST	N/A	N/A	100	106	118	125	129	140	146	155	2.7
Average	100	102	101	105	113	118	124	133	143	153	2.1

1. With the exception of the Technical Support Manager that showed a decrease in salary in the year 1993, all the salary figures showed a stable or continuous upward movement.
2. Since 1994, every job skill is showing a larger index than the previous year. In other words, the average salaries of all the IT managers have been increasing since that year.
3. In the year 2000, the Chief Information Offices or Vice President (CIO/VP) category showed the largest index from the base year. The lowest index was found in the Data Center Manager category. Put in another way, CIO/VPs showed the fastest growth in salaries since the base year and Data Center Managers had the slowest salary growth.
4. Two management categories shared the largest average index growth. These two groups were System Analyst and Programming Managers and Personal Computer Work Station Managers. In other words, these two groups had the fastest average annual salary growth during this period. Telecommunications Managers had the slowest average annual salary growth.
5. In any given year, some of the jobs showed similar index growth patterns. However, the range between the highest and lowest indices can be

- rather large. Compared to the yearly average, many of the indices are not within the plus and minus 1 range.
- Among the different jobs, some of the annual indices are similar. Again, there were also wide variations in the indices.
 - Using the annual average computed to gauge the changes, the index growth patterns do not fit a constant pattern. In some years, the respective job indices are growing faster than its annual average.

In other words, their respective salary growth was faster in some years and slower in others.

The National Percent Growth of IT Management Level Salaries for the period 1991 through 2000 also showed some very interesting trends. Using the differences in salaries between two immediate years, the magnitude of the increases provided additional insight into the behavior of the indices explained earlier. The computed results are presented in Table 3 and discussed below:

Table 3 National Percent Growth of IT Management Level Salaries: 1991-2000

Job Titles	92-91	93-92	94-93	95-94	96-95	97- 96	98-97	99-98	00-99	Average
CIO/VP	0.5	4.9	1.1	9.2	5.1	5.7	12.1	7.1	8.1	6.0
ISD	1.4	3.0	5.3	6.8	5.4	6.5	8.9	6.8	6.8	5.7
SAPM	3.3	2.8	8.5	5.6	5.1	3.5	9.8	6.1	6.6	5.7
TSM	2.5	-4.3	10.6	7.0	5.2	2.9	8.3	5.8	6.3	4.9
NM	N/A	N/A	5.2	6.2	6.0	3.2	7.1	8.3	7.7	6.2
APPM	3.3	1.1	3.4	5.4	5.4	4.5	7.7	7.3	7.7	5.1
DAM	0.2	1.5	3.4	6.8	1.3	8.4	9.5	8.7	8.3	5.3
TM	2.2	0.3	1.5	6.8	5.0	5.4	8.0	6.8	6.5	4.7
AS400M	N/A	N/A	3.4	8.1	5.3	4.5	6.5	8.2	N/A	6.0
DCM	N/A	N/A	1.7	6.4	4.9	6.9	6.8	5.1	5.4	5.3
PCWST	N/A	N/A	5.8	11.3	5.3	3.3	8.6	4.8	5.8	6.4
Average	1.9	1.0	3.2	7.5	4.5	5.5	7.9	6.8	6.7	5.5

- Technical Support Manager is the only group that showed a one-year decrease in salary. It happened in the year 1992 to 1993.
- Every job skill category is showing an increase in salary after 1993. All the computed percentages came out positive.
- The period 1997 to 1998 appeared to be the best year for salary increases. The average percent growth of all the jobs was found to be 7.9 percent, the highest of the ten years examined. Much of this raise went to CIO/VP category. It is the only one that received a double-digit salary growth during this period. All the raises obtained during this period were greater than the average percent raise awarded to the respective jobs during the ten-year period.
- The three other years that showed higher than average raises for most of the jobs appear to be 1994-95, 1998-99, and 1999-2000. In most instances, the raises obtained during these three periods were also larger than the average percent raise for the ten-year period.
- In any given year, a very small number of jobs showed similar percent growth patterns. However, the range between the highest and lowest percent can be rather large. Compared to the yearly average, many of the percentages are also not within the plus and minus 1 range.
- Among the different jobs, a very small number of the annual percentages are similar. However, there are also wide variations in the percentages.

- Using the annual average computed to gauge the changes, the percentage growth patterns do not fit a constant pattern. In some years, the respective job percentages were growing faster than its annual average. In other words, their respective salary growth was bigger in some years and less in others.

The Regional Index Growth of IT Management Level Salaries for the period 1991 to 2000 were presented in Table 4. Using the national index growth for the respective jobs as the basis for comparison, there are also several very interesting trends about the salaries of IT managers. Some of the major findings include:

- With the exception of the Midwest region, telecommunication managers are also showing a lower index than the regional average index in all the other four regions. Data center managers also share a similar predicament. The Southwest region is the only one that is increasing Data center manager salaries faster than managers with other job skills.
- Chief Information Officers/Vice Presidents, Information Systems Directors, Systems Analysts and Program Managers, and Personal Computer Workstation Managers appear to be the only four types of jobs that get faster pay increases in the majority of the four regions.
- With the exception of one job category, the Southwest region appeared to consistently show a lower index for the same type of work elsewhere. Every group, other than data center managers,

- showed an index that is smaller than the national average.
- Overall, the Northeast region appeared to pay more for IT managers. With the exception of technical support managers and data center managers, all the other indices were larger than the national average.
 - The Southeast region appeared to best mirror the national average. Many of the indices either matched the national average or were within plus and minus 1 from the national average.
 - With the exception of the West Coast, AS400 managers showed a lower index than the regional average index in all the other four regions. In other words, these managers are consistently receiving slower salary increases than their colleagues with other job skills.

Table 4 Regional Growth Index of IT Management Level Salaries: 1991 - 2000

Jobs Titles	Northeast	Midwest	Southeast	Southwest	West Coast	Nation
CIO/VP	129	119	124	122	128	124
ISD	139	123	127	117	118	125
SAPM	137	126	128	120	125	127
TSM	116	123	122	111	125	119
NM	124	122	123	116	129	123
APPM	130	124	120	105	125	121
DAM	121	125	122	112	116	119
TM	122	124	117	114	114	118
AS400M	121	116	116	110	131	119
DCM	116	115	123	120	122	119
PCWST	128	119	126	118	146	127
Average	126	121	123	115	125	122

The Regional Percentage Growth of IT Management Level Salaries for the period 1991 through 2000 was presented in Table 5. This table provided a lot of implications about the effects of location on the magnitude of the salary increases. Some of the major ones are discussed below:

- Again, the Southwest region showed the lowest percentage increase in salary. With the exception of the salaries for AS400 Managers, every other job did not even match the national percentage rates.
- The Southeast region showed the highest percentage increase. Every job skill in this region either exceeded the national percentage rates or was within plus and minus 1 from it.
- Five types of job skills consistently exceeded the national rates or were within plus and minus 1 from it. These job titles were Chief Information Office/Vice-President, Information Systems Directors, Systems Analysts and Project Managers, Network Managers, and Data Center Managers.

Table 5 Regional Average Percentage Growth of IT Management Salaries: 1999-2000

Jobs Titles	Northeast	Midwest	Southeast	Southwest	West Coast	Nation
CIO/VP	6.3	5.3	6.0	5.5	7.0	6.0
ISD	7.2	5.3	6.2	4.8	4.7	6.0
SAPM	6.4	5.5	7.8	4.7	5.6	6.0
TSM	4.1	5.0	5.8	3.7	6.0	5.0
NM	6.2	6.2	6.6	5.4	6.8	6.2
APPM	5.8	5.9	5.4	3.1	5.6	5.2
DAM	5.2	5.7	5.9	4.2	5.9	5.4
TM	6.1	5.7	5.7	4.2	8.6	6.0
AS400M	4.1	4.6	6.5	5.8	5.6	5.3
DCM	6.5	5.1	6.6	4.8	9.5	6.5
PCWST	4.8	5.7	5.0	3.6	4.5	4.7
Average	5.7	5.5	6.1	4.5	6.3	5.7

7. SUMMARY AND IMPLICATIONS

Using the data set from DataMasters, this research project examined the salaries of eleven categories of IT managers for the period 1999 to 2000. Analysis of both the national and regional growth indices and percentages

showed some clear differences in the way salary was awarded among the different jobs as well as regions. A summary of the major findings are presented below:

- Five types of job skills consistently exceeded the national rates or were within plus and minus 1 from it. These job titles were Chief Information

- Office/Vice-President, Information Systems Directors, Systems Analysts and Project Managers, Network Managers, and Data Center Managers.
- With the exception of the West Coast, AS400 managers showed a lower index than the regional average index in all the other four regions. In other words, these managers are consistently receiving slower salary increases than their colleagues with other job skills.
 - Since 1992, all the job skills showed an increasing index. The largest indices were found between the years 1997 and 2000. In other words, these were the years with the fastest and largest pay raises.
 - In any given year, a very small number of jobs and some regions showed similar index and percentage growth patterns. However, the range between the highest and lowest indices and percentages can be rather large. Compared to the yearly average, many of the percentages are also not within the plus and minus 1 range.
 - The Northeast region appeared to show the fastest change in salaries for IT managers. With the exception of technical support managers and data center managers, all the other indices were larger than the national average.
 - Consistently, the indices and percentages obtained from the Southeast region either exceeded the national indices or percentages or they were within plus and minus 1 from the national averages. On the other hand, the Southwest region consistently showed the lowest salary index as well as the lowest percentage growth.

The outcomes of this study have a number of implications for employers as well as for employees. First and foremost, IT salaries will continue to increase as long as the current market conditions remain the same. Employers must therefore build into their budgets room for pay raises at all times. To be competitive, such pay raises must at least meet the regional index or percentage growth rate for that job skill. In addition to this understanding, this study also showed that:

- Salary raises are not equally distributed every year. Depending on market conditions, employers may have to pay more to attract and retain highly skilled IT managers in certain years. This means that employers must continually monitor market conditions and have a contingent pool of funds to meet higher than normal salary conditions that may not have been anticipated.
- Salary raises are also not equally distributed across all IT management skills. One of the important lessons learned from this study is that not all job skills are equally valued and demanded. Employers should always consult industry figures to be sure that they are not underpaying certain job skills or overpaying others.
- Salary raises are not equally distributed across regions. Different localities have different factors that affect salaries. The salary raises must be in

line with the index as well as the percentage for that region, if not city.

- Certain job skill salaries are more predictable than others. For example, Chief Information Officers, Information Systems Directors, Data Center Managers, and Systems Analysts and Programmer Managers will always have higher than average pay raise.

Finally, IT managers seeking greener pastures, the Southwest region does not appear to be a good choice. This region consistently provides lower salary raises and the growth indices are also the lowest one in the nation.

8. CAVEATS AND LIMITATIONS

The results of this research should be interpreted with a number of limitations in mind. First, the data included on monetary figures. Even though it is true that money represents the primary form of compensation offered to employees, other forms of benefits can be as important and may even be bigger than the monetary amounts offered. For example, Chief Information Officers and Vice-Presidents of companies are often provided lucrative stock options, travel allowances, housing subsidies, and performance bonuses. Such packages may be equal to or exceed the money offered. These benefits could have affected the outcomes. Second, the data set obtained from DataMasters only showed IT salaries from persons responding to the study. As with all survey data collected, non-response rate may be a problem.

Despite the two limitations indicated above, the results reported here could still be considered representative of the population. First, the DataMasters annual salary report was collected by a nationally respected company. Second, a conservative decision was made to just include the median salaries in this study. Third, great care was taken with the interpretation of the results. For these reasons, the indices and percentages generated here can be accepted as accurately reported.

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