Journal of International Information Management

Volume 12 | Issue 1 Article 7

2003

Salaries of information technology managers; A trend analysis

Kai S. Koong
Mississippi State University

Lui C. Liu
Mississippi State University

Richard Fowler
University of Texas

Follow this and additional works at: http://scholarworks.lib.csusb.edu/jiim

 Part of the Management Information Systems Commons

Recommended Citation

Koong, Kai S.; Liu, Lui C.; and Fowler, Richard (2003) "Salaries of information technology managers; A trend analysis," *Journal of International Information Management*: Vol. 12: Iss. 1, Article 7.
Available at: http://scholarworks.lib.csusb.edu/jiim/vol12/iss1/7

This Article is brought to you for free and open access by CSUSB ScholarWorks. It has been accepted for inclusion in Journal of International Information Management by an authorized administrator of CSUSB ScholarWorks. For more information, please contact scholarworks@csusb.edu.

Salaries of information technology managers: A trend analysis

Kai S. Koong
Lui C. Liu
Mississippi State University

Richard Fowler
University of Texas - Pan American

ABSTRACT

During the economic boom of the last decade, companies and organizations have to offer 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 dramatic rise in salary trends, determining the worth of an employee as measured by wages will always remain a critical management issue. History has shown that irrespective of economic conditions, salaries will continue to rise. As the economy recovers and given the projected mass exodus of governmental information technology workers in the coming years, managers will need to be ready to deal with the difficult issue of high salary again. This study examines national and regional salary trends of IT managers. Specifically, the salaries examined are for the years 1991 through 2000, the period where salaries were often adjusted because of the imbalance between the supply of and the demand for IT professionals. From the employee who is looking for a reasonable salary package to the employer who must determine a sufficient pay raise to retain an IT manager, the findings and trends reported in this study should be useful and interesting.

INTRODUCTION

From the software retail outlet at the local mall in a small town to an international financial conglomerate in a metropolitan city, skilled information technology (IT) professionals are always needed to ensure that the business is operating smoothly. For individuals that have selected the challenge to excel in the IT sector, this career path can offer almost unlimited potential. As long as the IT professional 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.

Obviously, one of primary reasons for selecting a career in the IT area is finance. 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

Published by CSUSB ScholarWorks, 2003

year (Hansen, 2000). In addition to high salaries, the jobs may also offer lucrative benefits such as stock options and annual bonuses. While it may sound like a dream in most job categories, for highly skilled information technology workers, it was and can still remain a reality (Ruhan, 2000). Stories about young and successful entrepreneurs who have pursued their dreams in the IT world and become millionaires can still be found in popular computer magazines. Many of their business associates and employees, including secretaries, have also become wealthy individuals in a relatively short period of time because of their companies' success.

Like in the case of many other industry sectors, determining an individual's worth to an organization can be a very difficult task. Academic credentials, experience, rank, seniority, and years of service are critical compensation factors. However, pay differences can also be caused by the type of job classifications and the degree of shortage in the market for persons with that type of skills. The differences in pay can be quite large. For example, persons in key IT positions have been increasing at an annual rate of about 13 percent (Cole, 1999). From the period 1999 through 2000, operations systems manager is one of the categories of IT professionals that have enjoyed this double-digit annual pay hike. SQL administrators, on the other hand, averaged only an 8 percent raise in pay (Hansen, 2000).

It is important to point out that the averages indicated previously apply only 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 mre 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).

STATEMENT OF THE PROBLEM

In the new millennium, information technology is undoubtedly a fundamental driver of global business and economic growth. Virtually every segment of the global economy has embraced information technology as the means for improving their operations. Towards the end of the last decade, 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). Together with the explosive growth in job creation during the last economic boom, it led to the massive demand for IT workers. While it is true that this shortage of IT workers exists in virtually every major business sector, financial institutions, software developers, Web-based retailers, manufacturing, telephony services, on-line entertainment, and transportation companies are especially affected.

Indeed, the 1990s were wonderful years for people working in the computing sector. Salaries and compensation packages surged to record levels as a result of the robust economy and the shortage of information technology professionals (Cole, 1999; Greenberg, 2000; Hansen, 2000; Ruhan, 2000; Thibodeau, 2000a; Thibodeau, 2000b; Tristam, 1998). Individuals employed in the computing sector posted salaries that were 85 percent higher than those enjoyed by the

private sector as a whole (Shapiro, Price & Mayer, 2000; Menezes, 1999). Many computing professionals, both males and females, acquired sufficient wealth to become classified as millionaires during this period.

Most information technology dependent industries are experiencing a period of relief from the current economic slowdown. However, some economic analysts have already speculated that the industry slide has likely hit rock bottom (Marsan, 2002). Moreover, some 29 percent of all governmental IT workers are over the age of 50. Since federal workers are eligible to retire at age 55, the government is expecting a mass exodus of their IT work force soon. 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 ("America's New Deficit", U.S. Department of Commerce, 1998). One governmental agency, the Defense Department, is already involved with initiatives that can recruit and retain top staffers by beefing up bonuses (Anthes, 2002). As the nation recovers and the exodus from governmental agencies become a reality, the imbalance between the supply and demand for skilled IT professionals may result in rapidly rising salaries as well as other incentive programs to attract and to retain desirable employees again.

Given the possible upsurge in market demand for IT labor again, it is therefore critical that managers have the needed information for making competitive salary decisions. Employees are always looking for jobs that offer the highest salary and best compensation benefit (Dubie, 2000). Employers, on the other hand, must find employees who are willing to work for as low a compensation package as possible. 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).

STATEMENT OF THE OBJECTIVE

By itself, salary determination is a fairly complex, dynamic, and sometimes sensitive subject. Salaries carry an intrinsic message because they indicate the relative worth or value of employees to employers. An employer that fails to offer a salary that is competitive may risk losing a prospective candidate or existing staff member to a competitor. To the employees, accepting a lower salary can have long-term implications because retirement packages and other compensation benefits are often tied to salary figures. A question that will always haunt the employers and employee relationship is what is the right salary (Dubie, 2000; MacClaren, 1999)?

National and regional salary information can provide a good starting point for offers and counter offers between employers and employees. An understanding of the salary trends can also help both parties to arrive at a mutually acceptable salary decision. This study examines the national and regional salary trends of IT professionals. The IT job categories examined are all management related. Specifically, the salaries examined are for the years 1991 through 2000, the period where there was a shortage of IT professionals. 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,

Published by CSUSB ScholarWorks, 2003

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.

METHODOLOGY

Data for this study was extracted from the Website belonging to the DataMasters organization. Founded in 1971, DataMasters provides support for all areas of information systems to both large and small companies with their IT projects. DataMasters is also affiliated with National Computer Associates, an international network specializing in the recruitment and placement of information systems professionals. The complete data set for the 10-year period can be downloaded for free from http://www.datamasters.com/survey.html. DataMasters provides the data as a service to the profession "to enable employers and candidates to evaluate their own compensation situation." (2001 Computer Industry Salary Survey, 2001). Dowden & Company, a compensation research firm based in Pennsylvania, conducted the actual survey.

All salary figures reported were classified into the five primary geographic locations, namely, Northeast, Midwest, Southeast, Southwest, and West Coast. Each annual report is presented in two groups, namely, management and professional staff. In accordance with the primary objective stated in this study, the data extracted included only management related job titles. Finally, each job title consists of three salary figures, namely, 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 selected for analysis in this research.

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).

An index was used for assessing 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 so that was selected as the base year for those job titles. Percentages were used to evaluate the short-term behavior that is inherent in the data set. Major fluctuations between immediate periods observed can easily be detected using this simple mathematical tool. Finally, Analysis of Variance (ANOVA) was used to test for differences in the annual indices as well as the percent of change among the respective job titles. Based on the results obtained from analyzing the indices and the average percentages between years, the ANOVA tests were

performed on the national as well as the regional data sets to determine if the differences were statistically significant.

FINDINGS

From the period 1991 through 2000, the DataMasters database reported a total of 11 job titles. As indicated earlier, 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. One of the skills appeared to have become obsolete in the year 2000 because no data was available for this category. That job title was AS400 Manager.

Table 1. IT Management Salary Indices - National

Job Titles	'91	'92	'93	'94	'95	'96	'97	'98	'99	'00
CIO/VP	100	100	105	106	116	122	129	144	154	167
ISD	100	101	105	110	117	124	132	143	153	164
SAPM	100	103	106	115	121	128	132	145	154	164
TSM	100	103	97	107	114	120	124	134	142	151
NM	N/A	N/A	100	105	112	118	122	130	141	153
APPM	100	103	104	108	114	120	125	135	145	156
DAM	100	100	101	105	113	114	122	132	145	158
TM	100	102	102	104	111	116	122	132	141	152
AS400M	N/A	N/A	100	104	112	118	123	132	142	N/A
DCM	N/A	N/A	100	102	108	113	121	129	136	143
PCWST	N/A	N/A	100	106	118	125	129	140	146	155
Average	100	102	101	105	113	118	124	133	143	153

The IT Management Salary Indices for the 11 types of jobs covering the whole country are presented in Table 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. 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. Other major trends that can be identified in Table 1 are:

- 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. In other words, salaries of CIO/VPs grew the fastest and Data Center Managers the slowest.

Published by CSUSB ScholarWorks, 2003

- Within each respective year, some of the jobs categories exhibited similar indices. However, the range between the highest and lowest indices can be rather large. Compared to the yearly average, many of the indices are not even within the plus and minus 1 range.
- Among the different jobs categories, some of the annual indices are similar. Again, there were also wide variations in the indices among those that were different.
- Seven job categories had ending indices that exceeded the computed average salary growth index of 153 in 2000. The categories were CIO/Vice President, Information Systems Director, System Analysis and Programming Manager, Technical Support Manager, System Analyst/Programmer/Project Manager, Database Administration Manager, AS400 Manager and PC Work Station Manager. In 2000, the growth index of Network Managers matched the average computed for all the jobs listed.
- Three job categories lag behind the computed average salary growth index in 2000. These job categories and their indices for the period examined were Telecommunications Manager, 152; Technical Support Manager, 151; and Data Center Manager, 143

Table 2. IT Management Salary Between Years Percentage Changes - National

Job Titles	92-91	93-92	94-93	95-94	96-95	97-96	98-97	99-98	00-99	Decade 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

Percentage changes in IT management salaries between two immediate years for the whole country are presented in Table 2. Using the differences in salaries between two immediate years, the magnitude of the increases provided some additional insight into the behavior of the indices explained earlier. Again, it is important to note that every job skill category showed an increase in salary after 1993. With the exception of the Technical Support Manager category for the period 1992-93, all the computed percentages came out positive. Some of the other principal outcomes are:

- 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 the CIO/VP category. It is the only one group that received a double-digit salary growth during this period. All the raises obtained during this period were greater than the computed average percent pay raise awarded to the respective jobs during the ten-year period.
- Four other periods, 1994-95, 1997-98, 1998-99, and 1999-2000, also showed average pay raises that exceeded 5.5 percent, the computed average percent pay raise for the decade studied. In most of the job categories examined, the raises obtained during these four periods were also larger than the decade long computed average percent pay raise.
- In any given year, a very small number of jobs showed similar percent growth patterns. However, the range between the highest and lowest percent is also 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 among the job categories.

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

Table 3. Average IT Management Salary Indices - Regional

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

Published by CSUSB ScholarWorks, 2003

The average IT management salary indices for the period 1991 to 2000 were presented in Table 3. Using the national index growth for the respective jobs as the basis for comparison, there are distinct characteristics that could further explain the behavior of the data from the former two Tables. Some of the major findings include:

- Three regions, the Northeast, Southeast, and the West Coast, have average indices that are higher than the computed average for the whole country. In other words, salaries in these three regions lead the nation in their speed of growth. The Southwest region had the slowest average index.
- The average index gaps between the five regions were rather large. The indices range from a high of 126 to a low of 115. That gap translates to a difference of almost 10 percent between the highest paying region and the lowest paying region.
- Overall, the Southeast region appeared to be the best reflection of the national trend. An overwhelming majority of the average job indices of this region are within a plus or minus three from the national computed averages.
- Based on the average salary index, it can be said that the demand for the respective job categories are definitely dependent on region. With the exception of the Southwest region that trails behind in every IT management category, the other four regions have at least one job category that showed the highest average index. The categories and regions with the leading indices were depicted using an asterisk (*) in Table 3. In addition, it can also be seen from the same Table that while it may be having the fastest index in a region, it could be one of the lower index in another region. One such example is in the case of the Chief Information Systems Directors category. In the Northeast, these experts received the fastest salary growth. They are one of three job groups that showed the slowest salary growth in the West Coast.

Table 4. Average IT Management Salary Percentage Changes - Regional

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

The average IT management salary percentage changes pertaining to the five regions for the period 1991 through 2000 are presented in Table 4. 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:

- Consistent with the outcomes presented in Table 3, the Southwest region showed the lowest average percentage increase during the decade studied. Again, this is the only region that does not even have a single percent average that is higher than the other four regions in every category of job examined. The highest average percent for each job category is indicated using an asterisk (*) in Table 4. As a matter of fact, with the exception of AS400 Managers, the average change for every other job category did not even match the national average figures.
- The West coast region showed the highest average percentage increase during the 10-year period. Together with the Southeast region, every job skill in this region either exceeded the national percentage rates or was within a plus or minus 2 percent from it.
- Again, the demand for the respective job categories is also shown to be regionally dependent. A certain job may command the highest average percent in one region and yet it can also be among the lowest in another region. An excellent example of this phenomenon is in the case of the Chief Information Officer/Vice President (CIO/VP). In the West Coast region, CIO/VPs have an averaged of 7.0 percent increase in their salaries. This group was not even among the top five in average salary increases in the Mid-West region.

Analysis of Variance (ANOVA) tests were conducted on the National indices as well as the between year percentage changes for the period. Using a 2-tailed test, the outcomes as indicated by the p-values were statistically significant at the 0.000 levels. In other words, all the 11 jobs were found to exhibit different rates of change as measured using the indices and amount of change as assessed by the percent of change each period. To identify additional trends pertaining to the data set, ANOVA tests were further done on the regional average indices and average percentages. These results were presented in Tables 5 and 6.

Table 5. ANOVA on Regional Average Indices

Region	Mean Difference	Standard Deviation	Standard Error Mean	t-statistic	Significance (2-tailed)
Northeast	125.72	7.67	2.31	54.37	0.000
Mid-West	121.45	3.67	1.11	109.74	0.000
Southeast	122.55	3.80	1.15	106.84	0.000
Southwest	115.00	5.14	1.55	74.23	0.000
West Coast	125.37	8.72	2.63	47.68	0.000

Published by CSUSB ScholarWorks, 2003

Table 6. ANOVA on Regional Average Percent Changes

Region	Mean Difference	Standard Deviation	Standard Error Mean	t-statistic	Significance (2-tailed)
Northeast	125.72	7.67	2.31	54.37	0.000
Mid-West	121.45	3.67	1.11	109.74	0.000
Southeast	122.55	3.80	1.15	106.84	0.000
Southwest	115.00	5.14	1.55	74.23	0.000
West Coast	125.37	8.72	2.63	47.68	0.000

Whether the data set was examined using regional average indices or regional average percent changes, all the t-statistics were found to be significant at the 0.000 level of alpha. These second sets of ANOVA outcomes provided the evidence to show that the root of the salary gaps between the respective job categories can be traced to the regional level. In short, the findings of this research showed that at the national level, the salary growth patterns of the different IT manager categories are significantly different. At the regional level, it was further found that those significant differences have a geographic explanation.

CONCLUSIONS AND IMPLICATIONS

As expected, the findings from this research study show that during a period of sustained economic growth such as the one in the last decade, the cost of hiring and retaining IT managers will rise annually. Budget managers will definitely need to build in a sufficient amount of money for this purpose. From a macro perspective, this needed amount of money can be affected by two major factors, namely job categories and geographic location. Based on the national data trends from this study, a minimum reasonable annual across-the-board raise needed is about 5.5 percent. Then, depending on market factors, budget managers may want to put aside an additional minimum of 2.4 percent for unanticipated pay hikes because the average for a certain year can be as high as 7.9 percent. Finally, budget managers may also want to set aside an additional sum of money to adjust the salaries of IT managers that may require extraordinary high raises. Examples of such IT managers include Chief Information Officers/Vice Presidents, Systems Analysis and Programming Managers, and Database Administration Managers where those salaries can rise between 9.5 to 12.1 percent a year.

Further analysis of the national data trends also showed some clear differences in the way salary was awarded among the different jobs. Since 1996, three types of IT managers have raises that consistently exceeded the national averages rates for the given year. These job titles were Chief Information Office/Vice-President, Information Systems Directors, and Database

Administration Managers. In the last decade, these three categories have gradually climbed the corporate ladder and are considered as top management or executives where people skills, communication skills, and business skills are required. From the perspective of business educators, such a trend is particularly welcomed. It clearly shows that in addition to technical expertise, IT managers will need to acquire requisite business and management knowledge if they wish to command a better pay grade. One possible way IT managers can increase their marketability and attain those opportunities is by pursuing a graduate degree in the field of business administration, information technology management, or management information systems.

Assessing the data from a micro level using the regional trends, two other critical factors were identified to affect salary hikes. First, demands for specific IT job skills are highly dependent on geographic locations. A certain job skill may fetch a high salary in one region and yet in another region, it could rate among the lowest paying jobs. Such a case is especially true in the case of AS400 Managers. In the West Coast, these managers are among those groups that have the fastest salary growth. On the other hand, they are second slowest salary growth groups in the Southwest. In 2000, data on this group of managers was not even available and it is possible that this skill is gradually fading out as a major IT category. Obviously, to enjoy the type of desired salary growth, persons in those affected specialties will need to be mobile and be willing to relocate. Managers that cannot relocate should expect to consistently receive slower salary increases and be ready to change to another area because their specialization can one day be no longer needed.

Second, the regional trends also show that pay and raises may be highly related to the level of migration and cost of living in a particular geographical location. Based on the 2000 Census, the West, Southeast, and particularly the Southwest showed significant population growth. It is clear from the regional data that the lowest paying region is comprised of states that have lower cost of living averages and higher levels of persons migrating into them. With a larger labor pool to choose from and a lower cost of living environment, companies are able to offer less in initial salaries and annual raises.

Third, from the perspective of marketable IT managers desiring competitive salaries, the West Coast appears to be the region of choice. It leads the nation in salary and pay raise in 6 of the 11 job categories. The Southeast region may be the other choice region. It comes in second with 3 highest paying categories. It was also observed from the regional data set that these are the two regions that showed the higher pay and annual raises for upper level IT management jobs pointed out in the national trend identified.

Finally, this study provided evidences to show that salary and raises are not equally distributed every year and in every region. It fluctuates and the ranges between the highest and the lowest salary as well as percentage of raise can be quite large, depending on job category, location, and other economic factors in particular. Such differences and volatility require that budget managers and employers have good access to national salary and pay raise information and regional figures in particular. Ideally, this means that employers must continually monitor national market conditions and consult local industry figures to be sure that they are not under-

Published by CSUSB ScholarWorks, 2003

paying certain job skills or overpaying others. Similarly, IT managers considering a job change or who must relocate must be realistic in their salary and pay hike expectations. A proper understanding of current national and regional salary trends can definitely come in handy for any monetary negotiation and decision that they must make.

CAVEATS AND LIMITATIONS

While it is true that the data covered a national sample and was collected by a highly regarded company, the results of this research should still be interpreted with a number of limitations in mind. First and foremost, the data set included merely monetary figures. Money represents only one form of compensation offered to employees. For IT managers, especially those in upper management positions, other forms of compensation and benefits can be as important and may even be bigger than the monetary amounts offered. Such benefits may include but not limited to lucrative stock options, travel allowances, housing subsidies, and annual performance bonuses. These benefits are not accounted for and they could greatly affected recruitment and retention outcomes. Second, the data set extracted contained information from persons responding to the study. As with all survey data collected, non-response rate may be a problem. Third, the results are especially relevant for budgeting decisions that deal with a period of sustained economic growth. The set included only data up to 2000 because the economy moved toward a recession after that year. In the case of an economic downturn, the behavior of the national and regional trends can be expected to be different. As far as the need for salary hikes during a recession, it is the least of management worries because most IT management jobs are not union related. As a matter of fact, recent events have shown that many of these IT management jobs have to be eliminated, if not outsourced to lower cost centers. In addition, the AS400 Manager category was removed in 2001 and a new category called Internet architect was added. Addition of data sets after 2000 would not have benefited the study. In fact, it would have compromised the original objective of this research.

Finally, it is important to note that the three limitations pointed out above did not reduce in any way the significance of the findings identified. These limitations were stated to ensure that the findings were interpreted and used in their proper context. Great care was taken in the selected of the targeted database for this study. DataMasters and Dowden & Company, the company that gathered the annual salary reports, are both nationally respected companies. A conservative decision was also made to just use the median salaries for analysis and robust techniques were used for assessing and interpreting the results. For these reasons, it can be confidently said that the outcomes reported here are definitely representative and acceptable, if not accurate of the exact trends around the nation and in the respective regions during the robust economic decade prior to the millennium.

ACKNOWLEDGEMENT

Support for this research was provided by a grant from the United States Department of Education to the Computing and Information Technology Center at the University of Texas – Pan American.

REFERENCES

America's New Deficit (1998). *U. S. Department of Commerce.*

Anthes, Gary H. (2002, March 25). Uncle Sam's Brain Drain. *Computerworld (36),* 36-38.

Cole, G. (1999, October 28). The IT Job Market: Now and Later. *Computerworld*, downloaded from http://www.computerworld.com/cwi.html.

Dubie, D. (2000, July 17). Getting Your Due? *Network World, 17,* 61-64.

Greenberg, R. (2000, October). A Real Shortage of IT Workers. *Techniques, 75*, 26-27.

Hansen, F. (2000, December). Current Trends in Compensation and Benefits. *Compensation and Benefits Review, 32,* 6-13.

Koong, Kai S., Lai C. Liu, and Xia Liu. (2002). A Study of the Demand for Information Technology Professionals in Selected Internet Job Portals. *Journal of Information Systems Education, 13*(1), 21-28.

MacClaren, R. C. (1999). What's Your Net Worth? *Promo Sourcebook Supplement*, 223-226.

Markey, Synthia, Lai C. Liu, and Kai S. Koong (2000). Some Observations on Web-based Recruitment by Selected Fortune 500 Companies. *Proceedings of Information Systems Education Conference*, Philadelphia, Pennsylvania. CD/ROM.

Marsan, Carolyn D. (2002, February 11). Has Slump Hit Bottom? *NetworkWorld (19),* 1, 12.

Menezes, Joaquim (August 1999). Pay Rates Reveal IT's Gender Gap. *Computing Canada, 25*(31) 11-12.

Ruhan, M. (2000, January). Facing the Shortage of Information Technology Professionals. *Electronic Commerce, 10*, 24-29.

Shapiro, Robert J., Price, L., and Mayer, J. (2000). Digital Economy 2000. *Office of Policy Development, Economic and Statistics Administration* (Washington: U.S. Department of Commerce), xiii.

The Digital Work Force: Building Infotech Skills at the Speed of Innovation (1999). *U .S. Department of Commerce.*

The 2001 Computer Industry Salary Survey, downloaded from http:// www.datamasters.com/survey.html.

Thibodeau, P. (2000a, November 20). Government Boosts Pay for Half its IT Workers. *Computerworld, 34*, 20-22.

Thibodeau, P. (2000b, October 16). CIOs: Recruit Trainable Rookies. *Computerworld, 34,* 105.

Tristram, C. (1998, August 31). Robbing Peter to Pay Paul. *Computerworld, 32,* 64.