

Regulation of Management Information Systems Development

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Abstract

This paper identifies Federal regulations that have impacted the development of Management Information Systems (MIS). The paper also reports the results of a survey undertaken to identify how much consideration is given to each regulation in the development of MIS. The study shows that computer consultants generally consider various laws when developing MIS and the laws that they emphasize most are laws which affect the areas in which they are working. This indicates that laws enacted are having the impact the regulatory agencies desired. The study also indicates that very few consultants think that communication companies should be required to build in the capability to intercept all encrypted data.

Introduction

Regulation of economic activity has as its central theme some sort of interference in the activity being regulated and involves a restriction of what otherwise would occur. Many laws at the national, state, and local levels affect the operations of businesses, and therefore, the development of management information systems (MIS). Computer applications in many industries, such as in the airline industry, are regulated.

This paper focuses on the impact federal laws, which apply to all industries, have on the development of MIS which apply to all industries. The first section identifies the significant federal laws which impact the development of

MIS. The second section of the paper reports the results of a survey undertaken to identify how much consideration is given to each regulation in the development of a management information system. The results of the survey are then discussed.

Identification of Federal Regulations

To identify the relevant laws which effect the development of MIS, a survey was made of related textbooks, periodical literature, the index to the Federal Code was reviewed, and discussions were held with knowledgeable people.¹ This process resulted in the identification of the following laws which have a potential impact on the development of a MIS: (1) The Occupational Safety and Health Act (OSHA) of 1970, (2) Internal Revenue Code of 1954 and its regulations,

Readers with comments or questions are encouraged to contact the authors via e-mail.

(3) The Privacy Act of 1974, (4) The Foreign Corrupt Practices Act of 1977, (5) The Electronic Funds Transfer Act of 1978, (6) The Computer Software Copyright Act of 1980, (7) The Counterfeit Access Device and Computer Fraud and Abuse Act of 1984, (8) The Electronics Communications Privacy Act of 1986, and (9) The Computer Fraud and Abuse Act of 1986.

OSHA requires that employers provide a place of employment free from recognized hazards and which complies with the safety and health standards promulgated under the act. Gallegos, Richardson and Borthick (1987) identified the following areas related to computers which could cause problems: (1) Noise levels from high speed printers and other data processing equipment may exceed OSHA-determined levels; and (2) Chemicals to be used in the case of fire or other emergencies might be stored without proper warnings posted.

The Internal Revenue Service has issued several Revenue Procedures concerning record keeping requirements when accounting records are maintained within automated data processing systems. (Reg. 31.6001-6) (Rev. Proc. 64-12, 80-42, 86-19) The regulation required that all machine-readable records must be retained by the taxpayer in a retrievable format that provides information necessary to determine the correct tax liability. The regulation requires that the following specific documentation for all files be retained: (1) record formats; (2) flowcharts; (3) label descriptions; (4) source program listings of programs that created the files retained; and (5) detailed charts of accounts.

In addition, audit trails should be designed to insure that the details underlying the summary accounting data may be easily identified. The recorded information must be kept as long as the contents may be material in the application of any internal revenue law. The taxpayer must also maintain the ability to access the retained records at the time of a service examination. This requirement could create problems if

the system changed in the interim.

The regulation also addresses the use of Data Base Management Systems (DBMS). The regulation states that the taxpayer is in compliance if he creates, for service use, a sequential file that contains all detail transactions necessary to create an audit trail to trace back to the underlying source documents. All necessary fields must be identifiable, and processable by conventional means. The process should be reviewed by the service prior to creation. The regulation requires the following minimum documentation: (1) Data Base Description, (2) Record layout of each segment with respect to the fields in the segments, (3) Systems Control Language, (4) Program Specification Block, and (5.) Program Communication Block.

In the Privacy Act of 1974 (Public Law 93-579), Congress affirmed the individual's right to privacy and recognized that the increased use of computers and sophisticated technology increases the potential harm to individual privacy. In general, the purpose of the act is to protect the individual from an invasion of privacy by Federal agencies. The act gives the individual the right to determine what personally relevant records are being kept and the right to insure that the records are correct.

The Privacy Act of 1974 is limited in that it applies only to Federal agencies. However, the Act specifically acknowledges the right to privacy and the threat to that privacy by computer and sophisticated technology.

The Foreign Corrupt Practices Act of 1977 (FCPA) prohibits the bribery of foreign officials and requires all companies registered with the SEC to keep records which fairly reflect the transactions and dispositions of the assets of the entity and to devise and maintain a system of internal controls sufficient to provide reasonable assurance that: (a.) transactions are executed in accordance with management's general or specific authorization; (b.) transactions are recorded as necessary to permit preparation of financial

statements, and to maintain accountability for assets; (c.) access to assets is permitted only in accordance with management's general or specific authorization; and (d.) the recorded accountability for assets is compared with the existing assets at reasonable intervals and appropriate action is taken with respect to any differences.

In 1978, the Electronics Funds Transfer Act (Public Law 95-630) was passed to provide a basic framework establishing the rights, liabilities, and responsibilities of participants in electronic fund transfer systems. Its primary objective is the provision of individual consumer rights. The act sets forth basic terms and conditions of transfers, appropriate documentation including a provision for periodic statements, procedures for starting and stopping pre-authorized transfers, procedures for resolving errors, establishes a maximum consumer liability for unauthorized transfers, and establishes the liability of the financial institution for certain damages.

The Electronic Funds Transfer Act also sets conditions for the issuance of cards or other means of access to the consumers account, prevents the compulsory use of electronic fund transfers, and provides for civil and criminal liabilities in the event of a violation of the law.

The Computer Software Copyright Act of 1980 recognized the exclusive rights of the developers and owners of computer programs.

The Counterfeit Access Device and Computer Fraud and Abuse Act of 1984 (Public Law 98-473, Chapter XXI) makes it illegal to knowingly access a United States government computer or a computer operated on behalf of the United States Government without authorization and to obtain or modify information therein.

The Electronic Communications Privacy Act of 1986 (Public Law 99-508) prohibits the interception of electronic communication and the unauthorized access into electronic-mail storage facilities. The law also allows the victim to sue for damages.

The Computer Fraud and Abuse Act of 1986 made it illegal to alter data stored in another state or data used by the federal government or operated by federally insured financial institutions. The law also outlawed trafficking in stolen passwords and all other forms of trespassing in a computer to obtain data with the intent to defraud.

The Survey

The laws identified above have the potential to affect the way in which a MIS is developed. Some laws will have more affect than others. To determine the effect that each of these laws has on the development of management information systems, a questionnaire was developed (Appendix A) and mailed to 200 members of the Independent Computer Consultants Association. The questionnaire was developed to determine how aware professionals involved in the development of information systems are of the various laws with which they must comply.

A question was developed related to each of the above laws. Respondents were asked to what extent they considered the regulation when developing a management information system. A scaled response from 1 to 5, was solicited in order to facilitate comparisons of the responses. One (1) corresponded with never and five (5) corresponded with always. In addition, each question had a block which could be checked if the question was not applicable to the respondent. This not applicable answer provided a means whereby the respondent could opt out of answering any question. This option should provide better information by not requiring an answer to a question with which the respondent is unfamiliar.

Two statements related to a controversial subject were included in the questionnaire. The respondents were asked to agree or disagree with two statements related to whether or not the ability to intercept encrypted data should be built into communication systems. These two ques-

tions will give some indication of how practitioners feel about the subject.

It is conceivable that the consideration a regulation gets from a practitioner will vary by the size of systems with which the practitioner deals. A question was included which asked the respondent to classify the number and type of systems with which they had consulted in the past two years. The types of systems identified were mainframes, networked PC's, and stand-alone PC's. The data was classified and analyzed accordingly.

A respondent's professional certification may also affect the extent to which he considers certain regulations. Accordingly, each respondent was asked to list all their professional certifications.

One open ended question was included on the questionnaire. The question asked what areas of automated data processing need additional regulation. The purpose of this question was to identify areas in which practitioners think regulation is inadequate.

Survey Results

The Independent Computer Consultants Association provided a list of 360 names and addresses of their members located in the following states: New York, New Jersey, North Carolina, South Carolina, Tennessee, Kentucky, and Florida. A random sample of 200 members was chosen for the survey. Useable responses were received from 48 members. This represents a response rate of 24%. Because all responses were received within thirty days of mailing, no test for response bias was performed. However, since no responses were received after thirty days it is possible that the results of the survey does not represent members that did not respond.

Table 1 summarizes the results of the survey by reporting the number of responses, means, standard deviations, maximum and minimum values of the responses to each question. The mean value of the responses to most questions indicate the particular law was considered sometimes. Two questions had a mean response greater than often. The mean response to question 8 indicated that the Computer Software

Table 1
Summary of Responses to Questions (See Appendix A)
Means, Standard Deviations, Maximum and Minimum Values

| Question | Number Of Responses | Mean | Std. Dev. | Max. | Min. |
|----------|---------------------|-------|-----------|------|------|
| 1 | 42 | 3.002 | 1.45 | 5 | 1 |
| 2 | 44 | 3.039 | 1.48 | 5 | 1 |
| 3 | 41 | 3.029 | 1.46 | 5 | 1 |
| 4 | 40 | 3.063 | 1.54 | 5 | 1 |
| 5 | 31 | 2.932 | 1.53 | 5 | 1 |
| 6 | 40 | 3.138 | 1.52 | 5 | 1 |
| 7 | 39 | 3.124 | 1.53 | 5 | 1 |
| 8 | 47 | 4.193 | .996 | 5 | 1 |
| 9A | 43 | 2.960 | 1.37 | 5 | 1 |
| 9B | 44 | 2.998 | 1.38 | 5 | 1 |
| 9C | 44 | 2.85 | 1.23 | 5 | 1 |
| 10 | 40 | 2.964 | 1.52 | 5 | 1 |
| 11 | 46 | 4.254 | .86 | 5 | 1 |

Act of 1980 was considered more than often, its mean response was 4.193. Question 11 also had a response mean which was more than often, its mean was 4.254. Question 11 indicated that information privacy was considered more than often in the development of MIS. The mean response to the other questions was very close to 3, which indicates that most laws are considered sometimes in the development of a MIS.

Table 1A contains a distribution of the responses. It classifies the responses into ranges and totals the number of responses in each category. For example, the distribution of responses for question 1 indicates that 11 respondents

hardly ever considered IRS regulation 31.60001-6, they responded by marking the scale less than 1.5. Ten respondents indicated that they quite frequently considered the regulation by marking the scale greater than 4.49. Six respondents marked (N/A) Not Applicable. The data reported in Table 1A is consistent with Table 1, in that questions 8 and 11 show that more respondents consider The Computer Software Act of 1980 and information privacy relatively often. This is reflected in a higher mean response for those two questions.

Table 1B gives the distribution of the respondents by the type of systems they served.

Table 1A
Distribution of Responses to Questions (See Appendix A)

| Question | Range < 1.5 | Range 1.5-2.49 | Range 2.5-3.49 | Range 3.5-4.49 | Range > 4.49 | N/A |
|----------|-------------|----------------|----------------|----------------|--------------|-----|
| 1 | 11 | 4 | 7 | 10 | 10 | 6 |
| 2 | 10 | 8 | 5 | 11 | 10 | 4 |
| 3 | 11 | 3 | 6 | 11 | 10 | 7 |
| 4 | 13 | 1 | 5 | 10 | 11 | 8 |
| 5 | 10 | 2 | 6 | 5 | 8 | 17 |
| 6 | 11 | 2 | 5 | 12 | 10 | 8 |
| 7 | 10 | 3 | 7 | 8 | 11 | 9 |
| 8 | 3 | 0 | 3 | 18 | 23 | 1 |
| 9A | 10 | 6 | 7 | 12 | 8 | 5 |
| 9B | 12 | 3 | 8 | 14 | 7 | 4 |
| 9C | 9 | 7 | 13 | 10 | 5 | 4 |
| 10 | 11 | 6 | 5 | 8 | 10 | 8 |
| 11 | 1 | 0 | 7 | 11 | 27 | 2 |

Table 1B
Distribution of Responses to Questions by Type of System (See Appendix A)

| No. of Systems | Mainframe Systems | Networked PC Systems * | Stand Alone PC Systems ** |
|----------------|-------------------|------------------------|---------------------------|
| 0 | 21 | 16 | 16 |
| 0 - 2 | 16 | 15 | 13 |
| 3 - 10 | 8 | 11 | 12 |
| 10 or more | 3 | 6 | 7 |

* - The number of PCs in the networks ranged from 2 to 2500.

** - The number of PCs in the stand alone systems ranged from 1 to 1250.

Twenty-one consultants did not serve any mainframe systems, sixteen served either 1 or 2 mainframe systems, eight consultants served between 3 and 10 mainframe systems, while three consultants served more than 10. Sixteen consultants did not serve any networked PC systems, fifteen consultants served 1 or 2 networked systems, eleven consultants served between 3 and 10 networked systems, while six of the consultants served more than 10 networked systems. Sixteen consultants did not serve any stand alone PC systems, thirteen consultants served 1 or 2 stand alone systems, twelve consultants served between 3 and 10 stand alone systems, While seven consultants served 10 or more stand alone systems.

It is possible that the a consultants point of view or professional orientation may create a difference in their response. Professional certification, consulting on mainframe systems, consulting on networked systems, and consulting on stand-alone systems were examined for differences in responses.

Professional Certification

Thirteen of the forty-eight responses received indicated professional certification. Several individuals held more than one certification. CDP was the most common type of certification, being held by seven respondents. Other certifications held were CSP, CNE, CMC, ICC, CCP, CSI, EA and Architect. A t-test was used to test for differences between the means of the responses of individuals who held professional certification and individuals not holding professional certification. No differences were significant at even the 25% level. These results indicate that professional certification made no difference in the consideration given to federal regulations involving the management information systems.

Mainframe Systems

Twenty-seven individuals indicated that they had provided services related to mainframe

systems during the last two years. A t-test was used to test for differences between the means of the responses for individuals who provided services to mainframe systems and those who did not provide services to mainframe systems. Table 2 reports the p-values for each question. Differences significant at the 10% level are noted for questions 4, 9B and 9C.

The mean level of consideration given to The Foreign Corrupt Practices Act of 1977 (question 4) by individuals providing services to mainframe systems was 2.698, while for those not providing service to mainframe systems was 3.508. These results indicated that individuals who provided services to mainframes systems gave less consideration to the Foreign Corrupt Practices Act of 1977 than individuals who did not provide services to mainframe systems.

The mean level of consideration given to providing a safe work environment by instituting procedures to prevent Carpal Tunnel Syndrome (question 9B) by individuals who provide service to mainframe systems was 2.58. Individuals who do not provide services to mainframe systems had a mean consideration level of 3.455. This result indicated that individuals who provided services to mainframe systems gave less consideration to providing a safe work environment by preventing carpal tunnel syndrome than individuals who did not provide services to mainframe systems.

Similarly, question 9C indicate that individuals who provided services to mainframe systems gave less consideration to the amounts of radiation emitted from CRTs than did individuals who did not provide services to mainframe systems.

Networked Systems

Thirty-two respondents indicated they had provided consulting services to clients with networked systems within the previous two years. The size of the networks ranged from 2 units to 2500 units. A t-test was used to test for

differences in the consideration given to each regulation based on whether or not services were provided to networked systems. Table 3 reports the results. Questions 6, 8, 9A and 11 all showed differences significant at the 10% level.

Consultants who provided services to networked systems considered The Electronics Communications Privacy Act of 1978 (question 6) at a mean level of 3.407, while consultants who provided no services to networked systems considered the Act at a mean level of 2.508. The difference is significant at a level in excess

of 10%. This result means that consultants who provided services to networked systems considered the Electronics Communications Privacy Act of 1978 to a greater extent than those who did not provide services to networked systems.

The survey also indicated that consultants who provided services to networked systems also considered the Computer Software Act of 1980 (question 8) to a greater extent than those consultants who did not provide services to networked systems. The mean level of consideration given to the Act by providers of services to

Table 2
Tests of Differences in Means - Mainframes (See Appendix A)

| Question | Mainframes Mean Sample Size | No Mainframes Mean Sample Size | P-Value |
|----------|-----------------------------------|--------------------------------------|---------|
| 1 | 2.917 23 | 3.105 19 | .6837 |
| 2 | 3.104 24 | 2.96 20 | .7469 |
| 3 | 2.905 22 | 3.174 19 | .5708 |
| 4 | 2.698 22 | 3.508 18 | .0937** |
| 5 | 2.935 17 | 2.929 14 | .9388 |
| 6 | 3.222 23 | 3.024 17 | .6904 |
| 7 | 3.195 21 | 3.042 18 | .754 |
| 8 | 3.984 25 | 4.430 22 | .1234 |
| 9A | 2.652 22 | 3.283 21 | .1282 |
| 9B | 2.580 23 | 3.455 21 | .0317* |
| 9C | 2.335 23 | 3.414 21 | .0028* |
| 10 | 3.05 20 | 2.878 20 | .7229 |
| 11 | 3.141 27 | 2.753 15 | .419 |

* - Indicates significance in excess of 5%.
** - Indicates significance in excess of 10%.

networked systems is 4.38, while the mean level of consideration given by consultants who did not provide services to networked systems is 3.793. The difference was significant at the 10% level.

Differences in the mean level of consideration given to noise levels from printers and other data processing related equipment (question 9A) was higher for consultants who provided services to networked systems than for those who did not provide services to networked systems. The mean level of consideration given by

those who provided services to networked systems is 3.192 while the mean level of consideration for those who did not provide services to networked systems is 2.427. The difference was significant at a level in excess of 10%.

Information privacy (question 11) was also considered to a greater extent by providers of services to networked systems than by consultants who did not provide services to clients with networked systems. The mean level of consideration given to information privacy by consultants who provided services to networked

Table 3
Tests of Differences in Means - Networks (See Appendix A)

| Question | Networks Means Sample Size | No Network Means Sample Size | P-Value |
|----------|----------------------------------|------------------------------------|---------|
| 1 | 3.141 27 | 2.753 15 | .419 |
| 2 | 3.173 30 | 2.75 14 | .387 |
| 3 | 3.196 27 | 2.707 14 | .3177 |
| 4 | 3.131 27 | 2.919 13 | .6895 |
| 5 | 2.878 20 | 3.032 11 | .7825 |
| 6 | 3.407 28 | 2.508 12 | .0828** |
| 7 | 3.211 27 | 2.929 12 | .6091 |
| 8 | 4.38 32 | 3.793 15 | .0559** |
| 9A | 3.192 30 | 2.427 13 | .0887** |
| 9B | 3.176 31 | 2.573 13 | .1854 |
| 9C | 3.027 31 | 2.427 13 | .1363 |
| 10 | 3.198 28 | 2.417 12 | .1344 |
| 11 | 4.444 32 | 3.821 14 | .0215* |

* - Significant in excess of 5%.

** - Significant in excess of 10%.

systems is 4.444, while the mean level of consideration given to information privacy by consultants who did not provide services to networked systems is 3.821. The difference was significant at a level in excess of 5%.

Stand Alone Units

Thirty-two respondents indicated that they provided consulting services to clients who had stand alone units within the last two years. The number of units ranged from 1 to 250. A t-test was used to test for differences in the means

level of consideration given to the laws. Table 4 reports the results. Significant differences at the 10% level were identified for four questions: 8, 9A, 9C and 11.

The mean level of consideration given to The Computer Software Act of 1980 by consultant who provide services to client who have stand-alone units was 4.355 compared to the mean level of consideration given by consultants who did not provide services for stand-alone units of 3.847. The difference was significant in excess of the 10% level.

Table 4
Tests of Difference in Means - Stand Alone Units (See Appendix A)

| Questions | Stand Alone Means Sample Size | No Stand Alone Means Sample Size | P-Value |
|-----------|-------------------------------------|----------------------------------------|---------|
| 1 | 3.211 27 | 2.627 15 | .2128 |
| 2 | 3.26 30 | 2.564 14 | .1449 |
| 3 | 3.215 27 | 2.671 14 | .2644 |
| 4 | 3.116 28 | 2.938 12 | .7374 |
| 5 | 3.008 20 | 2.795 11 | .7176 |
| 6 | 3.185 27 | 3.038 13 | .7703 |
| 7 | 3.108 26 | 3.158 13 | .8869 |
| 8 | 4.355 32 | 3.847 15 | .0998** |
| 9A | 3.257 29 | 2.346 14 | .0369* |
| 9B | 3.115 30 | 2.746 14 | .4197 |
| 9C | 3.17 30 | 2.164 14 | .0093* |
| 10 | 3.132 28 | 2.571 12 | .2903 |
| 11 | 4.484 31 | 3.78 15 | .0079* |

* - Significant in excess of 5%.

** - Significant in excess of 10%.

Consultants who provided services for stand-alone units considered threats to a safe work environment from noise levels of high speed printers and other data processing equipment and the level of radiation emitted from CRTs more often than consultants who did not provide services for stand-alone units. The means were 3.257 compared to 2.346 and 3.17 compared to 2.164 respectively. Both differences were significant in excess of the 5% level.

Information privacy is also given a higher level of consideration by consultants who provided services to stand-alone units. The mean level of consideration given to information privacy by consultants who provided services for stand-alone units was 4.484 as compared to 3.78 for consultants who did not provide services for stand-alone units. The difference is significant in excess of the 1% level.

Data Encryption

Question 12 asked whether or not data encryption was an important part of management information systems. Table 5 summarizes the response to the question. Eight of thirteen professionals agreed with the statement while five disagreed. Fifteen consultants who provide services to mainframe systems agreed with the statement while eleven disagreed. Eighteen consultants providing services to networked systems agreed with the statement while fourteen disagreed. Seventeen consultants providing services to stand-alone units agreed with the statement while fifteen disagreed. Twenty-six of the forty-eight respondents agreed with the statement, slightly more than half.

Under U. S. law the government has the right to intercept the wire, electronic, or oral communications of a suspected criminal by obtaining a special court order. Encryption of data can prevent, or increase the difficulty the government has in intercepting communications. Proposals have been made in Congress to require that service providers and operators maintain the capability to intercept particular communications (Denning 1993). Question 13 sought to determine the extent to which the industry thinks that Congress should enact legislation requiring communication companies to build in the capability to intercept all encrypted data. Only four consultants out of forty-eight agreed with the statement.

Additional Regulation

The survey made provisions for a respondent to indicate areas in which additional regulation was needed (question 16). The question was, "What areas of automated data processing need additional regulation?" The following areas were mentioned by the respondents: (1) Fees/Rates for data transmission using value added networks, (2) Health of computer operators should be protected, (3) Professional Certification, (4) All personnel issues should be protected by the Federal Government, (5) External transfer of information on WAN, (6) Audit firms and their spin-offs should not be allowed to offer management consulting or computer consulting, (7) When technology provides better protection for intellectual property this area needs further study, (8) Individual's right to see and correct personal data made available to others, (9) More standardization is needed, not more regulation,

Table 5
Results of Question 12 - Data Encryption is Important (See Appendix A)

| Variable | Agree | Disagree | Total |
|--------------|-------|----------|-------|
| Professional | 8 | 5 | 13 |
| Mainframe | 15 | 12 | 27 |
| Networks | 18 | 14 | 32 |
| Stand Alone | 17 | 15 | 32 |

- (10) Data encryption is used insufficiently, and
- (11) Regulation should deal only with fraud or theft.

Discussion And Conclusions

The survey results indicate that in general, laws which were enacted to affect the development of MIS are being considered by consultants who develop management information systems. Every question had a minimum response of 1 and a maximum response of 5 indicating that some consultants consider a specific law always while other consultants never consider that law in developing a MIS. In addition, professional certification did not contribute to the amount of consideration that a particular law received from the consultants.

Consultants who provided services to mainframe systems gave less consideration to The Foreign Corrupt Practices Act of 1977, and the potential for impact under the Occupational Safety and Health Act of 1970 of Carpal Tunnel Syndrome and amounts of radiation emitted from CRTs than consultants who did not provide services to mainframe systems. This result was unexpected, but may arise from the nature of consultation services. It is likely that consultants to mainframe systems would be called on for very technical assistance and not for assistance with procedures which would involve the compliance with laws. A client with a mainframe is more likely to have an in house staff that is responsible for compliance with regulations with consultants used only for more technical issues.

Consultants who provided services to networked systems showed a difference in the consideration given the Electronics Communication Privacy Act of 1978, the Computer Software Act of 1980, the Occupational Safety and Health Act of 1970, and to information privacy. In all instances consultants who provided services to networked systems gave more consideration to the aforementioned laws than consultants who did not provide services to networked systems. This result seems logical in that networked sys-

tems are more difficult to protect from intrusion by unauthorized persons than non-networked systems.

Consultants providing services to stand-alone units gave more consideration to the Computer Software Act of 1980 and information privacy than consultants providing services to other systems. The result may stem from the fact that PC's usually do not have a very secure operating system, and that compliance with policies is not monitored as closely with stand-alone units as with other systems.

Consultants providing services to stand-alone units also considered noise levels and radiation emitted from CRTs (the Occupational Safety and Health Act of 1970) more than consultants to other systems. More people may be using CRTs and keyboards in stand-alone units than in other systems. Small clients, requiring a consultant for a stand-alone unit, may not have enough units on hand to justify having someone on staff to manage noise and radiation levels. A client may hire a consultant for such advise.


All three groups gave consideration to the OSHA standards, however, the considerations were different. Consultants providing services to mainframes gave less consideration to Carpal Tunnel Syndrome and to amounts of radiation emitted from CRTs than did other consultants. Networked systems consultants and stand-alone consultants gave more consideration to the impact of noise from high speed printers and equipment than did other consultants. Consultants who provided services to stand-alone units gave more consideration to amounts of radiation emitted from CRTs than did other consultants.

About one-half of the consultants think that data encryption is an important part of management information systems, while very few think that communication companies should be required to build in the capability to intercept all encrypted data.

This paper identified the most important federal regulations which affect the development of management information systems and contributes to the understanding of how the regulations affect the development of the systems. The paper reported the results of a survey undertaken to determine the extent to which system developers consider the identified laws in developing a management information system. The paper identified areas which may be in the need of additional regulation, and ascertained how practitioners feel about the regulation of the interception of encrypted data.

Suggestions For Future Research

While the conclusions of the study are interesting, the size of the sample and the homogenous nature of the population sampled (all were members of Independent Computer Consultants Association) may limit the generalization of the results. Future studies should include larger and more diversified samples such as managers of information systems and accountants in consulting practices. In addition, other variables should be considered which may affect the level of consideration given to regulations (re: the education level, the age level, the level of experience, and employment status or position of the respondent).

Future studies should also address how regulation impacts systems development. For example, are the systems made more expensive, and if so in what manner? Does regulation require more system changes? Does the impact of regulation vary with client size? In addition, the impact of generally accepted accounting principles on the development of management information systems should also be investigated. 

The authors would like to express their appreciation for the assistance provided by the Independent Computer Consultants Association in making this research possible.

Footnotes

1. In addition to the authors, the regulations identified were reviewed by: a Chairman of a regional university's Department of Computer Information Systems, an Assistant Professor of Management Information Systems, an accounting doctoral student with 15 years of systems experience, an Assistant Professor of Accounting with experience in teaching EDP Auditing and Business Law.

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Appendix A

Survey Instrument

When developing a management information system with computer applications to what extent do you consider the following laws and regulations? Please indicate by marking a line across the scale at the point which best represents the extent to which you consider the law or regulation. For example, if you consider the regulation sometimes, but not often draw a line between the 3 and the 4 closer to the 3 or the 4 whichever is appropriate.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

Questions

1. Accounting records maintained and stored within automated data processing systems for Internal Revenue Service purposes (Reg. 31.60001-6) must be retrievable (even with system changes) and the following specific documentation must be retained: (a) record formats, (b) flowcharts, (c) label descriptions, (d) source program listings of programs that created the files retained, and (e) detailed chart of accounts.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

2. Internal Revenue Service Regulations (Reg. 31.6001-6) require that audit trails allow identification of source documents.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

3. Internal Revenue Service Regulations (Reg. 31.6001-6) require minimum documentation be maintained related to the construction of Data Base Management Systems as follows:

- a) Data Base Description
- b) Record layout of each segment with respect to the fields in the segments
- c) Systems control language
- d) Program specification block
- e) Program communication block

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

4. The Foreign Corrupt Practices Act of 1977 requires transactions to be recorded as necessary to permit preparation of financial statements and to maintain accountability for assets.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

5. The Electronic Funds Transfer Act of 1978 and its conditions for transfer requires documentation and provisions for periodic statements along with its other provisions.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

6. The Electronics Communication Privacy Act of 1986 prohibits the interception of electronic communications and the unauthorized access into electronic-mail storage facilities.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

7. The Computer Fraud and Abuse Act of 1986 prohibits the alteration of data stored in: 1) a computer in another state; or 2) a computer used by the Federal government; or 3) a computer operated by a federally insured financial institution. The Act also prohibits trafficking in stolen passwords.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

8. The Computer Software Act of 1980 recognizes the exclusive rights of the developers and owners of the software.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

9. The Occupational Safety and Health Act of 1970 (OSHA) requires that a safe work environment be provided for all employees. Possible considerations related to OSHA are:

A. Noise levels from printers and other data processing equipment may exceed OSHA-determined levels.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

B. Procedures to prevent Carpal Tunnel Syndrome.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

C. Amounts of radiation emitted from CRTs may be higher than allowed.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

10. Local fire codes may not allow certain chemical to be used in the case of fire.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

11. Information privacy is considered in the development of management information systems.

| | | | | | |
|-------|--------------|-----------|-------|--------|-------------------|
| 1 | 2 | 3 | 4 | 5 | |
| Never | Occasionally | Sometimes | Often | Always | Not Applicable |

Indicate Your Agreement Or Disagreement With The Following Two Statements

12. Data encryption is an important part of management information systems.

Agree Disagree

13. Congress SHOULD pass regulations requiring communication companies to build in the capability to intercept all encrypted data.

Agree Disagree

14. In the past two years, how many management information systems have you worked on as a consultant or helped to develop.

| | | | |
|-----------------|-------|---------------------------|-------|
| Mainframes | _____ | No. of PCs in the network | _____ |
| Networked PCs | _____ | No. of PCs in the system | _____ |
| Stand alone PCs | _____ | | |

15. What is your Professional Certification? (Circle all that apply)

CDP CISA CPA Other _____

16. What areas of automated data processing need additional regulation?

...THANK YOU FOR YOUR COOPERATION...

