

## Research Note

# An Investigation of the Impact of Organization Size on Data Quality Issues

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### ABSTRACT

*Data quality issues have become increasingly critical for information systems applications in organizations of all sizes. This paper presents results from a large-scale Australian survey of Australian CPA members. The research investigates major stakeholders' opinions on the importance of critical success factors affecting data quality and the actual performance on each of those factors. The results reveal whether dissimilarly-sized organizations differ in the way they measure the importance and performance of critical success factors for data quality in accounting information systems.*

*Keywords:* accounting IS; data integrity; database management; information in organizations; reliability of information

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### INTRODUCTION

Data quality (DQ) has become an increasingly critical concern of organizations (Lee et al., 2002, 2004; Redman, 1998; Wand & Wang, 1996). Regardless of the organization size, data quality issues impact an organization's information system. With the proliferation of data warehouses, communication and information technologies have experienced an increase in the awareness of and need for high DQ in organizations (Lee et al., 2002). DQ has been rated as a top concern to data consumers (Wang, 1996) and reported as one of the six cat-

egories commonly employed in management information systems research (Delone & McLean, 1992).

More and more electronically captured information requires processing, storage, and distribution through information systems (Siau et al., 2001). Advances in information technology (IT) have dramatically increased the ability and capability of processing accounting information. At the same time, however, it presents issues that traditional accounting systems have not experienced. Real-world practice suggests that DQ problems are becoming increasingly prevalent (Huang, Lee & Wang, 1999;

Redman, 1998; Wang & Wang, 1996). The traditional focus on the input and recording of data needs to be offset with recognition that the systems themselves may affect the quality of data (Fedorowicz & Lee, 1998). IT advances can sometimes create problems rather than benefit the organization, if DQ issues have not been addressed properly. Most organizations have experienced the adverse effects of decisions, based on information of inferior quality (Huang et al., 1999). The number of errors in stored data and the consequential organizational impact of these errors are likely to increase in numbers (Klein, 1998). Inaccurate and incomplete data may adversely affect the competitive success of an organization (Redman, 1992). Indeed, poor quality information can have a significant social and business impact. For example, *NBC News* reported that dead people still eat! Because of outdated information in US government databases, food stamps continued to be sent to recipients long after they died. Fraud from food stamps costs US taxpayers billions of dollars each year (Huang et al., 1999). Another example, from a business perspective, occurred when a financial company absorbed a huge net loss totaling more than \$250 million when interest rates changed dramatically, and the company was caught unaware due to poor data handling (Huang et al., 1999).

Examples of the consequences of poor DQ in AIS are also common. Errors in an inventory database may cause managers to make decisions that generate overstock or understock conditions (Bowen, 1993). One minor data entry error, such as the unit of product/service price, could go through an organization's AIS without appropriate DQ checks and cause financial losses to an organization and damage to its reputation. Therefore, DQ has become cru-

cial for the success of accounting information systems (AIS) in today's IT age.

The primary purpose of this research is to explore whether various sized organizations assess differently the factors influencing DQ in accounting information systems. There is a readily identifiable literature link to stakeholder groups relating to DQ. However, precise perceptions of the importance of critical factors from different stakeholder groups and organizational size are not explicit in the extant literature. This research allows for the investigation as to whether organizational size influences the critical success factors, and whether it is possible to generate some common critical success factors for different sized organizations.

Therefore, the hypothesis of this study is:

H<sub>1</sub>: There is a significant difference between different-sized organizations in their perceptions of importance and performance of critical factors for accounting information systems' data quality.

To provide insight, the research investigates major stakeholders' opinions on the importance of factors affecting DQ and the actual performance (achievement) on each of those factors. This knowledge will help assist organizations increase the operating efficiency of their accounting information system and contribute to the effectiveness of the management decision-making process.

## BACKGROUND AND RESEARCH FRAMEWORK

The general definition of data quality is data that is fit for use by data consumers (Huang et al., 1999). Data quality dimensions refer to issues that are important to information consumers (people who use

information). Many data quality dimensions have been identified that endeavor to set the framework for identifying quality issues relating to data. Strong, Lee, and Wang (1997) group the data quality dimensions into four categories: conceptual data quality, intrinsic data quality, accessibility data quality, and representation data quality, which are widely acceptable in the literature (Lee et al., 2002). Although there are no uniform lists for the data quality dimensions, the researchers adopt one of the commonly identified data quality dimensions for purposes of this research:

- *accuracy*, which occurs when the recorded value is in conformity with the actual value;
- *timeliness*, which occurs when the recorded value is not out-of-date;
- *completeness*, which occurs when all values for a certain variable are recorded; and
- *consistency*, which occurs when the representation of the data values is the same in all cases (Ballou et al., 1982, 1985, 1987, 1993)

In the data quality and data warehouse fields, there are four stakeholder groups, responsible for creating, maintaining, using, and managing data, that have been identified. They are data producers, data custodians, data consumers, and data managers (Shanks & Darke, 1998; Strong et al., 1997; Wang, 1998; ). In the accounting information systems area, auditors were recognized as fulfilling the role of monitoring how the accounting information systems work and the quality of the information that has been generated by the systems. A major job function of the internal auditor is to perform the internal

policing of financial records and to help ensure quality within the organization.

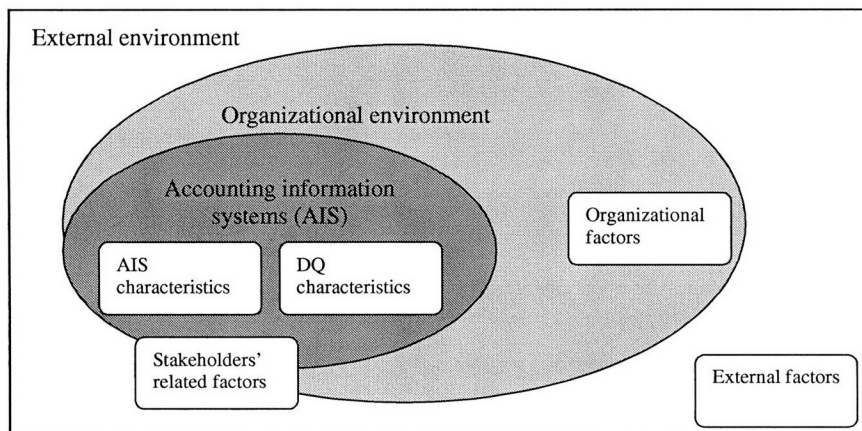
Much of data quality research focuses on processing, while accounting management research focuses on results checking and monitoring of data. In addition, the quality management area underscores and focuses on the source from where raw data originates. As a result, the quality management literature reveals that suppliers' quality management has been highlighted as an important aspect of total quality management (Badri, Davis & Davis, 1995; Saraph, Benson & Schroeder, 1989). In accounting information systems, data suppliers also play a role in data quality management. Therefore, they are included in the framework.

Thus, in summary, and concurrence with the above mentioned research areas, the stakeholders in accounting information systems have been identified as follows:

- information producers create or collect information for the AIS;
- information custodians design, develop and operate the AIS;
- information users use the accounting information in their works;
- information managers are responsible for managing the information quality in the AIS;
- internal auditors monitor the AIS and its data quality and check internal controls in the AIS; and
- data suppliers provide the unorganized raw data to the AIS.

The critical success factors model of accounting information systems' data quality (represented in Figure 1) was developed, based upon the AIS, data quality, quality management literature, and previous studies conducted by the authors (Xu, Koronios

Figure 1. Categories of factors impacting data quality in AIS (Xu, Koronios & Brown, 2001, 2002)



& Brown, 2001, 2002). Several categories of factors were identified that, according to the theoretical and empirical literature, have the potential to influence data quality in AIS. These categories were AIS characteristics, data quality characteristics, stakeholders' related factors, organizational factors, and external factors.

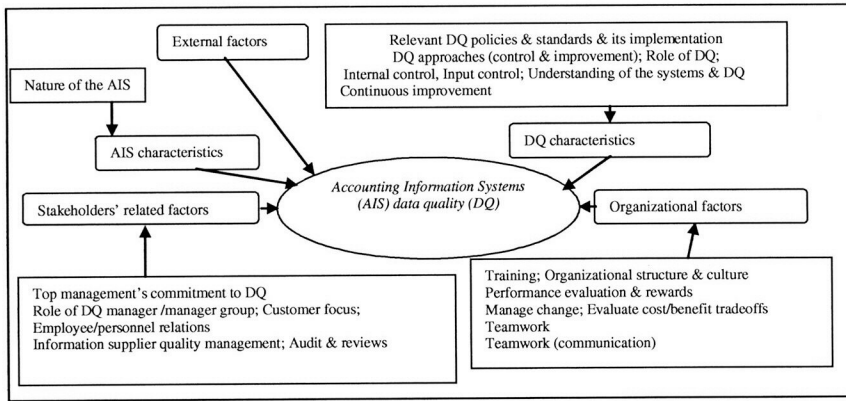
According to the relationships of those factors, they were organized into the research model shown in Figure 1, which contains five constructs at three levels. The first level is the external environment, which consists of external factors; the second level is the organizational environment, which consists of organizational factors; and the third level is the accounting information systems, which has AIS characteristics and data quality characteristics. Although there is only one factor, nature of the AIS, under the category of AIS characteristics, this factor has many attributes, such as the number of the systems/packages, the number of staff, what kind of system it is, the age and maturity of the system, and the organizational structure of the system. Stakeholders of AIS could come from within the AIS, outside the AIS but within

the organization, and outside the organization. For example, AIS could have both internal and external information suppliers and customers. Within each of those identified categories, a list of factors was grouped. Factors were identified by the comprehensive literature review and the empirical case studies (Xu, 2000).

The relationship among factors and categories is shown in Figure 2 and forms the model for factors influencing data quality in accounting information systems. There are seven factors listed under the category data quality characteristics; those factors are all related directly to the data quality itself. They are appropriate DQ policies and standards and its implementation, DQ approaches (control and improvement), Role of DQ, internal control, input control, understanding of the systems and DQ, and continuous improvement of DQ.

The stakeholders could come from both inside and outside the AIS and the organization. Human related factors have always been the focus within social science and IT research. The category of stakeholders' related factors in this research deals with the human/people related fac-

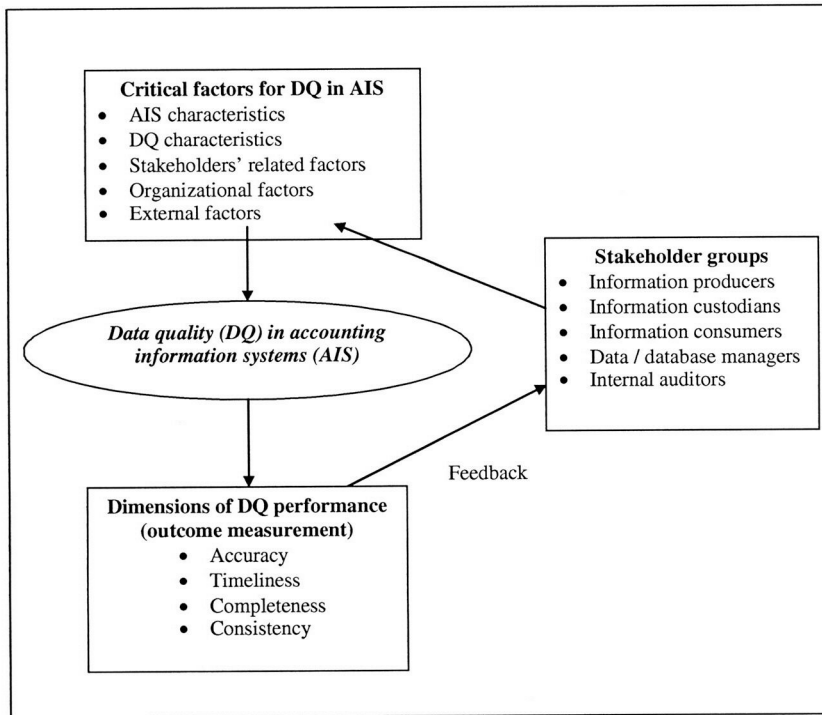
Figure 2. The model for factors influencing data quality in accounting information systems (Xu, Koronios & Brown, 2001, 2002)



tors' influence on DQ in accounting information systems. They include top management's commitment to DQ, the role of DQ manager/manager group, customer focus, employee/personnel relations, infor-

mation supplier quality management, and audits and reviews. At the organizational level, there are seven factors: training, organizational structure, organizational culture, performance evaluation and rewards,

Figure 3. Theoretical framework of this research



management of change, evaluation of cost/benefit trade-offs, and teamwork (communication). External factors have been identified as factors outside the organization from the external environment, over which the organization has little or no control.

This framework integrates several key themes concerning data quality management in accounting information systems. More specifically, this framework identifies five key categories for factors that impact data quality in AIS. Those categories are AIS characteristics, DQ characteristics, stakeholders' related factors, organizational factors, and external factors. In addition, five stakeholder groups for data quality in AIS also have been identified. The research framework assimilates the groups into data quality management in AIS, the segment of the framework that relates to data quality outcome measurement; Ballou et al.'s data quality dimensions were adopted.

## METHODOLOGY

The purpose of this study is to assess how the different stakeholder groups in different industries consider the importance and performance of critical success factors for data quality in AIS. A nationwide Australian survey was conducted, which was supported and administrated by the Australian Certified Practicing Accountants (CPA) Association. A total of 1,000 Australian CPA members were surveyed. Because the survey was administrated by the Australian CPA, and due to privacy policy restrictions on the disclosure of member information, it was not possible to identify the respondents who had not replied after the first mailing (i.e., the first letter and questionnaire) and, consequently, the addresses of the undelivered survey. The second letter, which was the combined

thank you/reminder courtesy letter, was printed at the same time as the first letter and questionnaire. It was dated and sent out to all members one week after the first mailing. An estimated 15% of the surveyed members were deemed not eligible or not available to answer the questionnaire for various reasons, as detailed in the following. Several non-responding members of the sample gave the following reasons for non-response:

- Retired
- No longer or not working with the AIS
- Moved overseas
- Don't feel qualified to answer the questionnaire

From the estimated 850 eligible questionnaire recipients, we received 182 completed questionnaires. This makes the response rate approximately 21%.

The survey questions and design were developed based on the results of multiple case studies conducted by the authors in earlier stages of the research project. The questionnaire includes three key sections: 25 Critical Success Factors for AIS's data quality; the three most and least important factors; and demographic details about the respondents and their organizations. Most of the questions were closed-ended to elicit comparable and measurable responses. The respondents also were given the opportunity to add written comments at the end of the survey.

The primary analysis tool used for the research was SPSS. A one-way ANOVA was employed for the testing. Turkey Post Hoc within ANOVA was applied to determine the relationships between paired groups.

Table 1. Respondents' main role

| Stakeholder           | Main Role   | Percent |
|-----------------------|---|---------|
| Information producer  | Create or collect data for the AIS                    | 36.0    |
|                       | Manage those who create or collect data for the AIS   |         |
| Information custodian | Design, develop, and operate the AIS                  | 32.3    |
|                       | Manage those who design, develop, and operate the AIS |         |
| Information manager   | Manage data and/or data quality in AIS                | 17.5    |
| Internal auditor      | Audit or review data in AIS                           | 0.5     |
| Information user      | Use accounting information in tasks                   | 11.5    |

## FINDINGS

### Demographic Information

This section describes some demographic information of the questionnaire. The survey respondents were asked to provide some basic information about their roles in relation to data quality in their organizations and their evaluations of data quality in their current AIS.

Table 1 shows that 36% of the respondents were information producers who created or collected data for the AIS or managed those who created or collected data. Another 32.3% of respondents were information custodians. They were responsible to design, develop, and operate their AIS or to manage those who design, develop, and operate the AIS. Only 0.5% of

respondents were internal auditors who were auditing or reviewing data in AIS.

We also asked the respondents to evaluate data quality in their current AIS. Figure 4 shows that more than half of the respondents (54.6%) considered their AIS's overall quality of data to be high. Another 13.1% of respondents rated it very high. Only 8.7% of respondents were not satisfied with the data quality in their systems.

The respondents were also asked background information about their organizations and themselves. The industry of the organization, the organization's location and size, and the respondent's job level are presented in the following. Since the purpose of this paper is to examine the effect that organizational size influ-

Figure 4. Respondents' evaluation of current data quality level

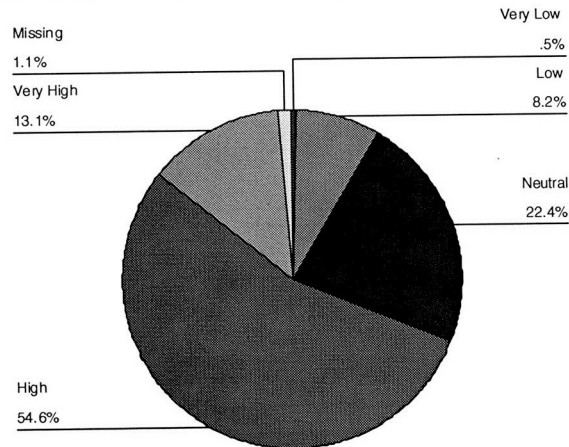
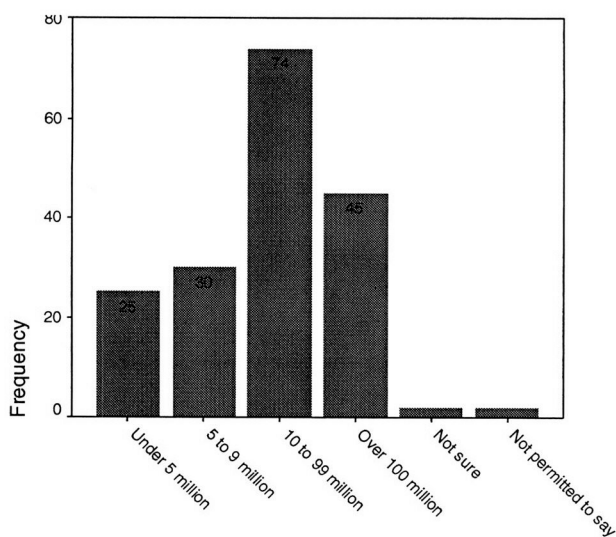


Figure 5. The annual revenue of the surveyed organizations



ences data quality, only the revenue figures of the surveyed organizations are presented.

Figure 5 shows that 74 organizations' revenues were between \$10 million and \$99 million. Only 25 organizations' revenues were under \$5 million. Two respondents indicated that they were not permitted to disclose their organizations' revenue.

### Major Findings

An organization's annual revenue figures were used as the scale for organization size for the purpose of this study. The questionnaire was designed to identify an organization's size, based on annual revenue, as follows: under \$5 million, \$5 million to \$9 million, \$10 million to \$99 million, and over \$100 million. There also were two

additional options provided in the survey for those respondents that were either not sure or not permitted to disclose their organizations' annual revenue figures. Table 2 shows how the annual revenue figures represent the different sized organization. For the purpose of this research, the scale for organization size is categorized as very small organizations (under \$5 million), small organizations (\$5 million to \$9 million), medium-sized organizations (\$10 million to \$99 million), and large organizations (over \$100 million).

ANOVA analysis was used to explore whether any significant differences exist between different sized organizations regarding the importance of the critical factors for accounting information systems' data quality. The ANOVA was chosen be-

Table 2. Annual revenue represents the size of the organizations

| Annual Revenue               | Size of the Organization |
|------------------------------|--------------------------|
| Under \$5 million            | Very small               |
| \$5 million to \$9 million   | Small                    |
| \$10 million to \$99 million | Medium                   |
| Over \$100 million           | Large                    |



cause of the constructs of interest (dependent variables); importance of the factors was measured on the interval scale, and the organizational size was seen as the independent variable. Table 3 presents the ANOVA results for the different sized organizations' respondents' perceptions regarding the importance of the critical factors for data quality in AIS.

As shown in Table 3, significant differences also are found regarding the importance of internal controls and the performance of audits and reviews between organizations that had different revenues. The Tukey Post Hoc analysis also was used to compare the pairs. The significant difference is found only to exist among the subgroups under the performance of audit and review factor. Table 4 summarizes the analysis of the Tukey test.

The Tukey tests showed that the means were significantly different between very small (the annual revenue under \$5 million), small (\$5 million to \$9 million), and medium (\$10 to \$99 million) organizations in the performance of audits and reviews factor with significant *P*, values of 0.011 and 0.049; and the mean difference was 1.18 and 0.86, respectively, which were the only two pairs that showed significant differences. Therefore, hypothesis H<sub>1</sub>, that there is a significant difference between different-sized organizations in their perceptions of importance and performance of critical factors for accounting information systems' data quality, is supported for only one factor's performance, *audits and reviews*, but not supported for other factors.

Lack of significant differences among the different sized organizations may be explained on the basis of the proliferation of the awareness of information quality issues in accounting information systems across all surveyed organizations. It illustrated that the size of the respondents' or-

ganizations did not have a significant influence on their perceptions of the degree of importance and performance of critical factors for data quality. In other words, the level of importance and performance of those factors was similar to surveyed organizations, regardless of their size. Therefore, it indicates the possibility of generating a set of commonly applicable critical success factors for ensuring data quality in accounting information systems across different sized organizations.

## CONCLUSIONS AND FUTURE RESEARCH

Only one critical success factor, *audits and reviews* performance, revealed statistical results that the research hypothesis did not support the contention that different sized organizations consider the importance and performance of critical factors for data quality differently. The study reveals some insights in data quality issues in AIS that have not been investigated before. The most significant findings are that the stakeholder groups in different sized organizations did not have significantly different evaluations regarding the importance and performance of most of the factors. Therefore, the study could help IT professionals and different sizes of organizations have a better understanding of critical success factors' impact on data quality in their specific AIS. It also helps to provide a possible benchmark for organizations to evaluate their own data quality performance against other organizations.

The findings of this study also indicate that the surveyed Australian organizations were aware of the importance of the critical success factors that impact data quality of accounting information systems. Future studies could consist of cross-country, cross-culture studies in order to address

Table 3. Different sized organizations' responses on the importance and performance of critical factors

|  | Revenue                      | Importance |                |      | Performance |                |      |
|--|------------------------------|------------|----------------|------|-------------|----------------|------|
|  |                              | Mean       | Std. Deviation | Sig. | Mean        | Std. Deviation | Sig. |
| Top Management Commitment                  | Under \$5 Million            | 4.16       | .688           | .938 | 3.44        | 1.044          | .500 |
|  | \$5 Million to \$9 Million   | 4.07       | .828           |      | 3.17        | 1.053          |      |
|  | \$10 Million to \$99 Million | 4.16       | .703           |      | 3.22        | 1.216          |      |
|  | Over \$100 Million           | 4.22       | .823           |      | 3.33        | 1.066          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 4.50       | .707           |      | 4.50        | .707           |      |
|  | Total                        | 4.16       | .745           |      | 3.28        | 1.132          |      |
| Middle Management Commitment               | Under \$5 Million            | 4.04       | .735           | .814 | 3.48        | .918           | .199 |
|  | \$5 Million to \$9 Million   | 3.97       | .809           |      | 3.07        | .980           |      |
|  | \$10 Million to \$99 Million | 4.16       | .683           |      | 3.07        | 1.058          |      |
|  | Over \$100 Million           | 4.09       | .821           |      | 3.22        | 1.085          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 4.50       | .707           |      | 4.50        | .707           |      |
|  | Total                        | 4.10       | .742           |      | 3.18        | 1.049          |      |
| Education and Training                     | Under \$5 Million            | 3.64       | 1.075          | .341 | 3.04        | 1.197          | .792 |
|  | \$5 Million to \$9 Million   | 4.00       | .910           |      | 2.63        | 1.033          |      |
|  | \$10 Million to \$99 Million | 4.08       | .807           |      | 2.85        | 1.244          |      |
|  | Over \$100 Million           | 3.91       | .793           |      | 2.89        | 1.092          |      |
|  | Not Sure                     | 4.00       | .000           |      | 3.00        | 1.414          |      |
|  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|  | Total                        | 3.96       | .862           |      | 2.86        | 1.155          |      |
| Clear DQ Vision for Entire Organization    | Under \$5 Million            | 3.72       | 1.100          | .964 | 2.92        | 1.222          | .724 |
|  | \$5 Million to \$9 Million   | 3.70       | .915           |      | 2.50        | 1.106          |      |
|  | \$10 Million to \$99 Million | 3.81       | .822           |      | 2.67        | 1.202          |      |
|  | Over \$100 Million           | 3.69       | .900           |      | 2.73        | 1.095          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|  | Total                        | 3.75       | .888           |      | 2.70        | 1.161          |      |
| Establish DQ Manager Position to Manage DQ | Under \$5 Million            | 3.00       | 1.041          | .472 | 3.60        | 1.780          | .886 |
|  | \$5 Million to \$9 Million   | 2.93       | 1.163          |      | 3.48        | 1.724          |      |
|  | \$10 Million to \$99 Million | 3.31       | 1.227          |      | 3.26        | 1.764          |      |
|  | Over \$100 Million           | 3.40       | 1.009          |      | 3.38        | 1.403          |      |
|  | Not Sure                     | 3.50       | .707           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 3.50       | 2.121          |      | 4.00        | 2.828          |      |
|  | Total                        | 3.23       | 1.142          |      | 3.38        | 1.669          |      |
| Organizational Structure                   | Under \$5 Million            | 3.52       | .963           | .966 | 3.36        | 1.319          | .140 |
|  | \$5 Million to \$9 Million   | 3.52       | .986           |      | 3.67        | 1.605          |      |
|  | \$10 Million to \$99 Million | 3.64       | .837           |      | 2.88        | 1.322          |      |
|  | Over \$100 Million           | 3.62       | 1.007          |      | 3.18        | 1.267          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|  | Total                        | 3.60       | .912           |      | 3.16        | 1.377          |      |
| DQ Policies and Standards                  | Under \$5 Million            | 3.48       | .872           | .332 | 3.16        | 1.313          | .786 |
|  | \$5 Million to \$9 Million   | 3.53       | .900           |      | 2.97        | 1.474          |      |
|  | \$10 Million to \$99 Million | 3.85       | .886           |      | 2.84        | 1.054          |      |
|  | Over \$100 Million           | 3.80       | .815           |      | 3.07        | 1.232          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 4.00       | .000           |      | 3.50        | .707           |      |
|  | Total                        | 3.74       | .866           |      | 2.97        | 1.215          |      |
| Organizational Culture                     | Under \$5 Million            | 3.76       | 1.052          | .970 | 3.12        | 1.201          | .362 |
|  | \$5 Million to \$9 Million   | 3.90       | .845           |      | 3.00        | 1.365          |      |
|  | \$10 Million to \$99 Million | 3.95       | .941           |      | 2.69        | 1.134          |      |
|  | Over \$100 Million           | 3.91       | .668           |      | 2.98        | 1.055          |      |
|  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|  | Not Permitted To Disclose    | 4.00       | .000           |      | 4.00        | .000           |      |
|  | Total                        | 3.90       | .864           |      | 2.89        | 1.173          |      |

more issues in this field. In addition, the objective evaluation of data quality outcomes could be combined with the stake-

holders' perceptions in this study to build the linkage between people's subjective perceptions of importance with objective actual outcomes of data quality.

Table 3. Different sized organizations' responses on the importance and performance of critical factors (continued)

|                                  | Revenue                      | Importance |                |      | Performance |                |      |
|----------------------------------|------------------------------|------------|----------------|------|-------------|----------------|------|
|                                  |                              | Mean       | Std. Deviation | Sig. | Mean        | Std. Deviation | Sig. |
| DQ Controls                      | Under \$5 Million            | 3.68       | .627           | .751 | 2.84        | 1.106          | .634 |
|                                  | \$5 Million to \$9 Million   | 3.80       | .664           |      | 2.60        | 1.003          |      |
|                                  | \$10 Million to \$99 Million | 3.84       | .898           |      | 2.75        | 1.160          |      |
|                                  | Over \$100 Million           | 3.96       | .673           |      | 2.98        | .941           |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 2.50        | 2.121          |      |
|                                  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                  | Total                        | 3.84       | .762           |      | 2.80        | 1.074          |      |
| Input Controls                   | Under \$5 Million            | 4.28       | .792           | .640 | 3.28        | .936           | .615 |
|                                  | \$5 Million To \$9 Million   | 4.37       | .669           |      | 3.27        | .944           |      |
|                                  | \$10 Million To \$99 Million | 4.31       | .681           |      | 3.07        | 1.051          |      |
|                                  | Over \$100 Million           | 4.49       | .661           |      | 3.31        | .949           |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 3.00        | 1.414          |      |
|                                  | Not Permitted To Disclose    | 4.00       | .000           |      | 4.00        | .000           |      |
|                                  | Total                        | 4.35       | .684           |      | 3.20        | .988           |      |
| User Focus                       | Under \$5 Million            | 3.84       | .624           | .562 | 3.00        | 1.118          | .556 |
|                                  | \$5 Million To \$9 Million   | 4.20       | .847           |      | 2.80        | 1.095          |      |
|                                  | \$10 Million To \$99 Million | 4.11       | .732           |      | 2.85        | 1.178          |      |
|                                  | Over \$100 Million           | 4.16       | .767           |      | 2.89        | .885           |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 2.00        | 1.414          |      |
|                                  | Not Permitted To Disclose    | 4.00       | .000           |      | 4.00        | .000           |      |
|                                  | Total                        | 4.10       | .742           |      | 2.88        | 1.082          |      |
| Nature of AIS                    | Under \$5 Million            | 4.24       | .523           | .677 | 3.20        | 1.080          | .446 |
|                                  | \$5 Million To \$9 Million   | 4.20       | .761           |      | 2.97        | 1.217          |      |
|                                  | \$10 Million To \$99 Million | 4.27       | .668           |      | 2.97        | 1.072          |      |
|                                  | Over \$100 Million           | 4.29       | .695           |      | 3.29        | .991           |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 4.00        | .000           |      |
|                                  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                  | Total                        | 4.25       | .669           |      | 3.10        | 1.074          |      |
| Employee Relations               | Under \$5 Million            | 4.32       | .627           | .276 | 3.32        | 1.069          | .394 |
|                                  | \$5 Million To \$9 Million   | 4.03       | .850           |      | 2.83        | 1.085          |      |
|                                  | \$10 Million To \$99 Million | 4.14       | .728           |      | 2.93        | 1.151          |      |
|                                  | Over \$100 Million           | 3.93       | .939           |      | 2.93        | 1.031          |      |
|                                  | Not Sure                     | 3.50       | .707           |      | 2.00        | .000           |      |
|                                  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                  | Total                        | 4.08       | .799           |      | 2.97        | 1.094          |      |
| Management of Changes            | Under \$5 Million            | 3.88       | .600           | .592 | 3.20        | 1.000          | .911 |
|                                  | \$5 Million To \$9 Million   | 4.03       | .556           |      | 2.93        | .828           |      |
|                                  | \$10 Million To \$99 Million | 4.11       | .653           |      | 3.08        | 1.044          |      |
|                                  | Over \$100 Million           | 3.98       | .812           |      | 3.02        | .988           |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 3.00        | .000           |      |
|                                  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                  | Total                        | 4.02       | .672           |      | 3.06        | .975           |      |
| Measurement and Reporting        | Under \$5 Million            | 3.60       | 1.000          | .600 | 3.24        | 1.234          | .488 |
|                                  | \$5 Million To \$9 Million   | 3.87       | .681           |      | 2.80        | .925           |      |
|                                  | \$10 Million To \$99 Million | 3.84       | .937           |      | 2.91        | 1.207          |      |
|                                  | Over \$100 Million           | 3.87       | .815           |      | 2.69        | 1.164          |      |
|                                  | Not Sure                     | 4.00       | .000           |      | 3.50        | .707           |      |
|                                  | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                  | Total                        | 3.81       | .868           |      | 2.89        | 1.149          |      |
| Data Supplier Quality Management | Under \$5 Million            | 3.28       | .980           | .434 | 3.24        | 1.690          | .432 |
|                                  | \$5 Million To \$9 Million   | 3.50       | .861           |      | 2.73        | 1.112          |      |
|                                  | \$10 Million To \$99 Million | 3.53       | .914           |      | 2.73        | 1.158          |      |
|                                  | Over \$100 Million           | 3.76       | .802           |      | 3.02        | 1.196          |      |
|                                  | Not Sure                     | 3.50       | .707           |      | 2.50        | .707           |      |
|                                  | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                  | Total                        | 3.55       | .885           |      | 2.88        | 1.244          |      |

Table 3. Different sized organizations' responses on the importance and performance of critical factors (continued)

|                                     | Revenue                      | Importance |                |      | Performance |                |      |
|-------------------------------------|------------------------------|------------|----------------|------|-------------|----------------|------|
|                                     |                              | Mean       | Std. Deviation | Sig. | Mean        | Std. Deviation | Sig. |
| Continuous Improvement              | Under \$5 Million            | 3.64       | .860           | .501 | 2.80        | 1.190          | .603 |
|                                     | \$5 Million to \$9 Million   | 3.83       | .648           |      | 2.50        | .938           |      |
|                                     | \$10 Million to \$99 Million | 3.82       | .783           |      | 2.64        | 1.054          |      |
|                                     | Over \$100 Million           | 3.91       | .793           |      | 2.82        | .984           |      |
|                                     | Not Sure                     | 4.00       | .000           |      | 3.50        | .707           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 3.81       | .770           |      | 2.70        | 1.030          |      |
| Teamwork (Communication)            | Under \$5 Million            | 3.92       | 1.115          | .316 | 3.24        | 1.268          | .883 |
|                                     | \$5 Million to \$9 Million   | 4.13       | .629           |      | 3.17        | 1.020          |      |
|                                     | \$10 Million to \$99 Million | 4.14       | .581           |      | 2.97        | .979           |      |
|                                     | Over \$100 Million           | 4.11       | .832           |      | 3.00        | 1.022          |      |
|                                     | Not Sure                     | 4.00       | .000           |      | 3.00        | .000           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 4.08       | .751           |      | 3.05        | 1.027          |      |
| Cost/Benefit Analysis               | Under \$5 Million            | 3.56       | 1.158          | .944 | 2.96        | 1.172          | .822 |
|                                     | \$5 Million to \$9 Million   | 3.53       | .973           |      | 2.87        | 1.408          |      |
|                                     | \$10 Million to \$99 Million | 3.45       | .830           |      | 2.68        | 1.376          |      |
|                                     | Over \$100 Million           | 3.40       | .889           |      | 2.62        | 1.284          |      |
|                                     | Not Sure                     | 3.50       | .707           |      | 2.00        | .000           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 3.46       | .909           |      | 2.73        | 1.313          |      |
| Understanding of the Systems and DQ | Under \$5 Million            | 4.08       | .640           | .416 | 3.29        | .999           | .204 |
|                                     | \$5 Million to \$9 Million   | 3.93       | .583           |      | 2.97        | .964           |      |
|                                     | \$10 Million to \$99 Million | 3.92       | .736           |      | 2.82        | 1.012          |      |
|                                     | Over \$100 Million           | 3.89       | .714           |      | 2.67        | .826           |      |
|                                     | Not Sure                     | 4.00       | .000           |      | 3.00        | .000           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 3.93       | .689           |      | 2.88        | .957           |      |
| Risk Management                     | Under \$5 Million            | 3.96       | 1.020          | .686 | 3.16        | 1.179          | .100 |
|                                     | \$5 Million to \$9 Million   | 3.87       | .681           |      | 2.70        | 1.149          |      |
|                                     | \$10 Million to \$99 Million | 3.76       | .824           |      | 2.51        | 1.230          |      |
|                                     | Over \$100 Million           | 3.76       | .830           |      | 2.60        | .939           |      |
|                                     | Not Sure                     | 4.50       | .707           |      | 1.50        | .707           |      |
|                                     | Not Permitted To Disclose    | 3.50       | .707           |      | 3.50        | .707           |      |
|                                     | Total                        | 3.81       | .829           |      | 2.66        | 1.150          |      |
| Personnel Competency                | Under \$5 Million            | 4.20       | .957           | .642 | 3.28        | 1.208          | .314 |
|                                     | \$5 Million to \$9 Million   | 4.27       | .583           |      | 3.03        | 1.159          |      |
|                                     | \$10 Million to \$99 Million | 4.08       | .717           |      | 2.86        | .984           |      |
|                                     | Over \$100 Million           | 4.07       | .728           |      | 3.14        | .824           |      |
|                                     | Not Sure                     | 4.00       | .000           |      | 2.00        | 1.414          |      |
|                                     | Not Permitted To Disclose    | 3.50       | .707           |      | 3.00        | .000           |      |
|                                     | Total                        | 4.12       | .733           |      | 3.01        | 1.017          |      |
| Physical Environment                | Under \$5 Million            | 3.96       | .676           | .706 | 3.84        | 3.738          | .746 |
|                                     | \$5 Million to \$9 Million   | 3.80       | .847           |      | 3.13        | 1.196          |      |
|                                     | \$10 Million to \$99 Million | 3.66       | .848           |      | 3.30        | 1.082          |      |
|                                     | Over \$100 Million           | 3.73       | .837           |      | 3.38        | .960           |      |
|                                     | Not Sure                     | 3.50       | .707           |      | 3.50        | .707           |      |
|                                     | Not Permitted To Disclose    | 3.50       | .707           |      | 3.00        | .000           |      |
|                                     | Total                        | 3.74       | .817           |      | 3.37        | 1.700          |      |
| Audit and Reviews                   | Under \$5 Million            | 3.36       | 1.221          | .159 | 3.68        | 1.626          | .001 |
|                                     | \$5 Million to \$9 Million   | 3.63       | .890           |      | 2.50        | 1.280          |      |
|                                     | \$10 Million to \$99 Million | 3.68       | .829           |      | 2.82        | 1.297          |      |
|                                     | Over \$100 Million           | 3.93       | .863           |      | 3.09        | 1.041          |      |
|                                     | Not Sure                     | 4.00       | .000           |      | 1.50        | .707           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 3.69       | .916           |      | 2.94        | 1.318          |      |
| Internal Controls                   | Under \$5 Million            | 3.88       | .833           | .044 | 3.20        | 1.118          | .991 |
|                                     | \$5 Million to \$9 Million   | 4.03       | .490           |      | 3.03        | .928           |      |
|                                     | \$10 Million to \$99 Million | 4.20       | .662           |      | 3.15        | 1.056          |      |
|                                     | Over \$100 Million           | 4.20       | .694           |      | 3.16        | .928           |      |
|                                     | Not Sure                     | 4.50       | .707           |      | 3.00        | .000           |      |
|                                     | Not Permitted To Disclose    | 3.00       | .000           |      | 3.00        | .000           |      |
|                                     | Total                        | 4.12       | .683           |      | 3.13        | .994           |      |

Highlighted reveal significant difference between groups

Table 4. Tukey post hoc test of paired difference between groups

| Revenue           | Revenue       | Mean Difference | Sig. |
|-------------------|---------------|-----------------|------|
| Under \$5 million | 5~9 million   | 1.18            | .011 |
| Under \$5 million | 10~99 million | .86             | .049 |

Dependent variable: The performance of audit and review

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