# Evaluation of Financial Information Quality Attributes: A Comparison from Turkey

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## Abstract

*Business operations and decisions depend on information. Information tear off the uncertainty clouds in front of the decision makers and give them a foundation for their decisions. In this study, it is aimed to figure out the similarities and differences between perceived importance of attributes of financial information quality throughout academicians' view and practitioners' view (banking sector practitioners). For this aim, accounting-finance academicians' view in Turkey is assessed and compared their results to the banking sector's practitioner's view. The answer for the question is seeked if the relative importance of the attributes noticed by academicians who study and lecture the foundations for financial information quality and practitioners who apply the financial information in their operations have the same importance according to each other. The differences occurred in the relative importance of the attributes will figure out the changes in the real world cases. For this, AHP method is used for assessing the relative importance of the attributes. To compare the rankings of these two groups Spearman's Rank Correlation Test is applied. As a result, it's been figured out that the rankings of academicians and practitioners don't have statistically significant difference.*

**Keywords:** Information Quality, Financial Information Quality, Accounting Information, Analytic Hierarchy Process

**JEL Classification:** M410, C440

## 1. *Introduction*

Information lies behind business decisions. For the decisions to be accurate, information should have some properties to serve the objective of the decision. Various researches have been made for determining the attributes of information and the rankings of these attributes. Importance of the attributes of information may change according to the decision. So it can be said that the attributes have different rankings within. In this paper, we tried to compare the relative importance of the attributes of financial information for the accounting-finance academicians and banking sector practitioners. For this aim AHP technique is used for determining the relative importance of the attributes. Spearman Rank Correlation Test is applied on the results to assert if the opinions of two groups are statistically significant or not.

## 2. *Literature Review*

One of the main properties of a system is to have the input-transaction processing-output and feedback process.

Approaching systems as a production line, it's obvious that having the "information" output which to be used in business operations is the result of quality data and processing systems. Data underlies information. Lee et al., identified data as "… a group of inconsistent and objective facts of events and structural records of transactions"(Lee et al., 2007).

From this point Ruzevicius and Gedminaite (2007) indicated that the efficiency of business processes relies on quality information, and the organizations should treat information not only as a subsidiary element, but also as a *product* for managing and improving their processes. With a similar approach, Sylvanus(1999) expresses information as a *resource* created from data serving management and decision making needs of the business. Michnik and Lo (2009) also stated information as a product serving users to satisfy their information needs.

On the other hand poor information quality causes business processes hinder and catastrophic consequences. Lima et al.(2007) summarized some of these consequences as customer dissatisfaction, increase in operational costs, reduced capacity and less effective decision making. Even Redman(1998), explained poor information quality in terms of its impact on operations, impacts at the tactical level and strategic impacts. Wang et al.(1995) indicated the importance of information quality within management responsibilities, operation and assurance costs, research & development, production, distribution, personnel management and legal function.

So, what does the quality of information that has so many effects on business operations mean? In other words what does information quality mean? In the information quality literature various researchers have described information quality in several ways. Kahn et al.(2002) contributed the information quality literature by giving the description of "the characteristics of information to meet of exceed customer expectations" and "information conforming to specifications or requirements". According to English (1996), information quality is "consistently meeting customers' expectations and through information and information services enabling them to perform their job effectively". Eppler(2000) defined information quality as "the characteristics of information to meet the functional, technical, cognitive and aesthetic requirements of information producers, administrators, consumers and experts".

The financial data composed during business operations are processed and transformed into financial statements and financial reports by accounting information systems. So, it's important to identify the factors that effect financial information quality for figuring out the subjects that will effect the business processes in terms of positive and negative ways. From this starting point Xu(2001) studied on key issues influencing accounting information quality management. Another research on accounting information quality is based on a report published by the Ministery of Public Finance of China "The Notice For Spot-Checking of the Quality of Accounting Information". Anlin & Huihui (2009), analyzed the fluctuations of accounting information for the years between 1999 and 2005 considering the report.

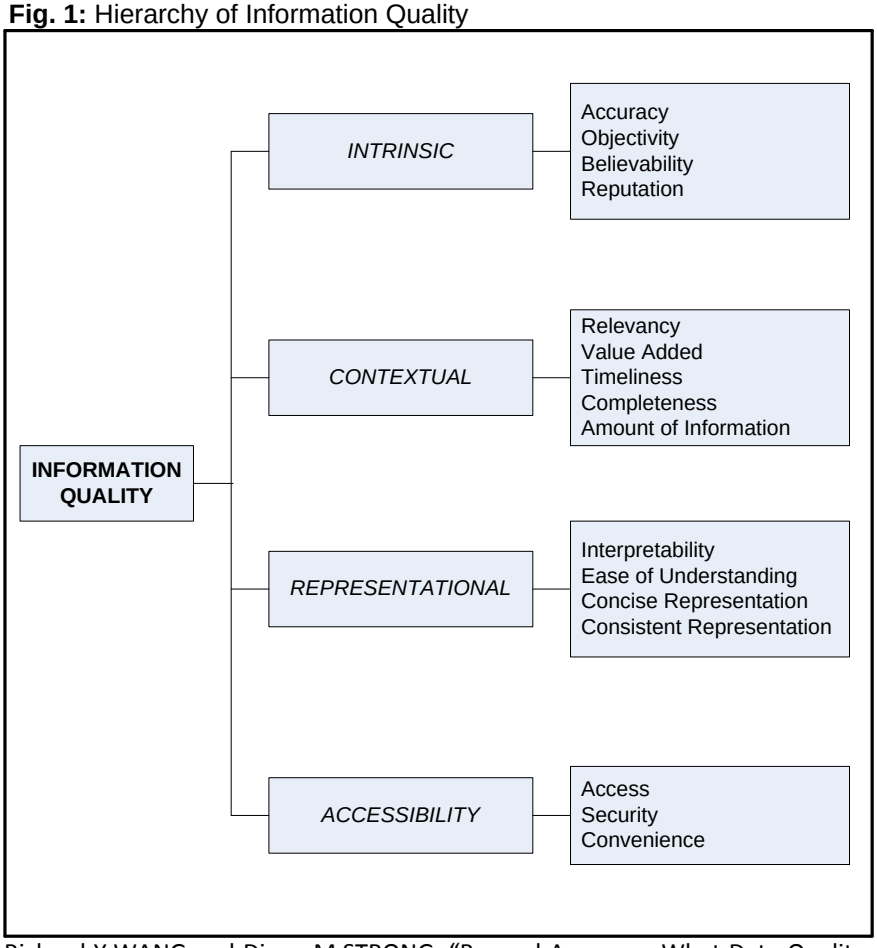
## *3. Dimensions of Information Quality*

How a physical product has quality issues such as ease of use, material used, design properties, durability, etc., information, considered as a product also has some quality issues. These issues are called information quality dimensions. Various researchers pointed out different classifications for IQ dimensions. Kahn et al.(2002) developed Product & Service Performance Model for IQ dimensions. In the model IQ has four dimensions which are sound, useful, dependable and usable. Naumann and Rolker (2000) presented their IQ dimensions. According to Naumann and Rolker quality of information is influenced by three main factors: perception of the user(the user), the information itself(the source) and the query process(process of accessing the information). Wang & Strong (1996) posed the dimensions of IQ in a hierarchical manner and categorized them into four basic groups. Intrinsic, contextual, representational and accessibility. Bovee and Srivastava (2003) defined IQ dimensions within the framework of accessibility, interpretability, relevance and integrity. Wang and Strong (1996) introduced dimensions for IQ in a hierarchical manner. In their study IQ was represented in four fundamental dimensions: Intrinsic, contextual, representational and accessibility. Within the hierarchy these four dimensions were also divided into sub-criterias.

The dimensions identified by Wang and Strong will be adopted in this research because they have addressed the most dimensions also indicated in accounting information quality regulations and have an acceptance in information quality literature.

Intrinsic IQ denotes that the information has quality in its own right (Wang and Strong, 1996). In other words, intrinsic IQ denotes the features which belong to internal characteristics of information (Michnik and Lo, 2009). This category includes accuracy, objectivity, believability, and reputation criterias. Intrinsic dimension tells that the source of the information is as important as the information itself. Thus, accuracy and objectivity is not enough for the high quality of information. Believability and reputation should be treated as integral part of intrinsic IQ (Ruzevicius and Gedminaite, 2007). Contextual IQ highlights the requirement that IQ must be considered within the context of the task at hand; that is, information must be relevant, timely, complete and appropriate in terms of amount so as to add value (Wang and Strong, 1996). So it can be said that contextual IQ aspect includes five sub-criterias which are relevancy, value added, timeliness, completeness and amount of information. Representational IQ and accessibility IQ emphasize the importance of the role of the systems; that is, the system must be accessible but secure and the system must present information in a way that is interpretable, easy to understand and represented concisely and consistently. In other words representational IQ includes aspects related to the format of the information(concise and consistent representation) and meaning of the information( and ease of understanding) (Wang and Strong, 1996). Accessibility IQ has three sub-criterias that are access, convenience and security (Michnik and Lo, 2009).

**Fig. 1:** Hierarchy of Information Quality




Richard Y.WANG and Diane M.STRONG, "Beyond Accuracy: What Data Quality Means to Data Consumers?", **Journal of Management Information Systems,** Vol. 12, No.4. 1996, p.20

As shown in Fig. 1, the four fundamental dimensions have been represented by 16 sub-criterias. For the intrinsic dimension (Pipino et al., 2002; Kargar et al., 2007);

*Accuracy:* Freedom from mistake or error; conformity to truth or to a standard model; degree of conformity of a measure to a standard or a true value.
*Objectivity:* The extent to which information is unbiased, unprejudiced and impartial.

*Believability:* The extent to which information is regarded as true and credible.
*Reputation:* The extent to which information is highly regarded in terms of its source or content.
For the contextual dimension sub-criterias are as follows;
*Relevancy:* Having significant and demonstrable bearing on the matter at hand. In other words relevant information is applicable and helpful for the task at hand.
*Value-added:* The extent to which information in beneficial and provides advantages from its use.
*Timeliness:* The extent to which information is sufficiently up-to-date for the task at hand.
*Completeness:* The extent to which information is not missing and is of sufficient breadth and depth for the task at hand.
*Amount of Information:* The extent to which the volume of information is appropriate for the task at hand.

Representational IQ dimension has the sub-criterias of;
*Interpretability:* To explain or tell the meaning. The extent to which information is in appropriate languages, symbols, and units and definitions are clear.
*Ease of Understanding:* Easy to be recognized or comprehend.
*Concise Representation:* Free from all elaboration and superfluous detail. In other words, information should be compactly represented.
*Consistent Representation:* Marked by harmony, regularity or steady continuity. Information should be presented in the same format.
For the Accessibility IQ dimension there are 3 sub-criterias are explained;
*Access:* The extent to which information is available, or easily and quickly retrievable.
*Security:* The extent to which access to information is restricted appropriately to maintain its security.
*Convenience:* Fitness or suitability for performing an action of fulfilling a requirement.

## *4. Financial Information Quality*

The quality of financial information implies the attributes which financial information should have for fulfilling the information needs for the information users. Considering from the perspective of the information users, the parties using financial statements are initially thought. But from a wider perspective the data used for preparing the financial statements also should have the quality issues for obtaining accurate, complete financial statements.

As specified in "Conceptual Framework for Financial Reporting: The Objective of Financial Reporting and Qualitative Characteristics and Constraints of Decision-Useful Financial Reporting" by IASB and FASB (2010), qualitative characteristics are the attributes that make financial information useful. In other words, qualitative characteristics of the financial information mean the quality attributes that a financial information should have. In the framework, the fundamental qualitative characteristics are expressed as relevance and faithful representation. There are also enhancing qualitative characteristics which are complementary to the fundamental qualitative characteristics. Comparability, verifiability, timeliness, and understandability are qualitative characteristics that enhance the usefulness of information that is relevant and faithfully represented. Besides IASB and FASB's framework, FASB (2008)has issued "Qualitative Characteristics of Accounting Information" in 1980 and amended in 2008. In the pronouncement, besides relevancy, faithfully representation, comparability, verifiability, timeliness and understandability, consistency is indicated as important qualitative characteristics of accounting information.

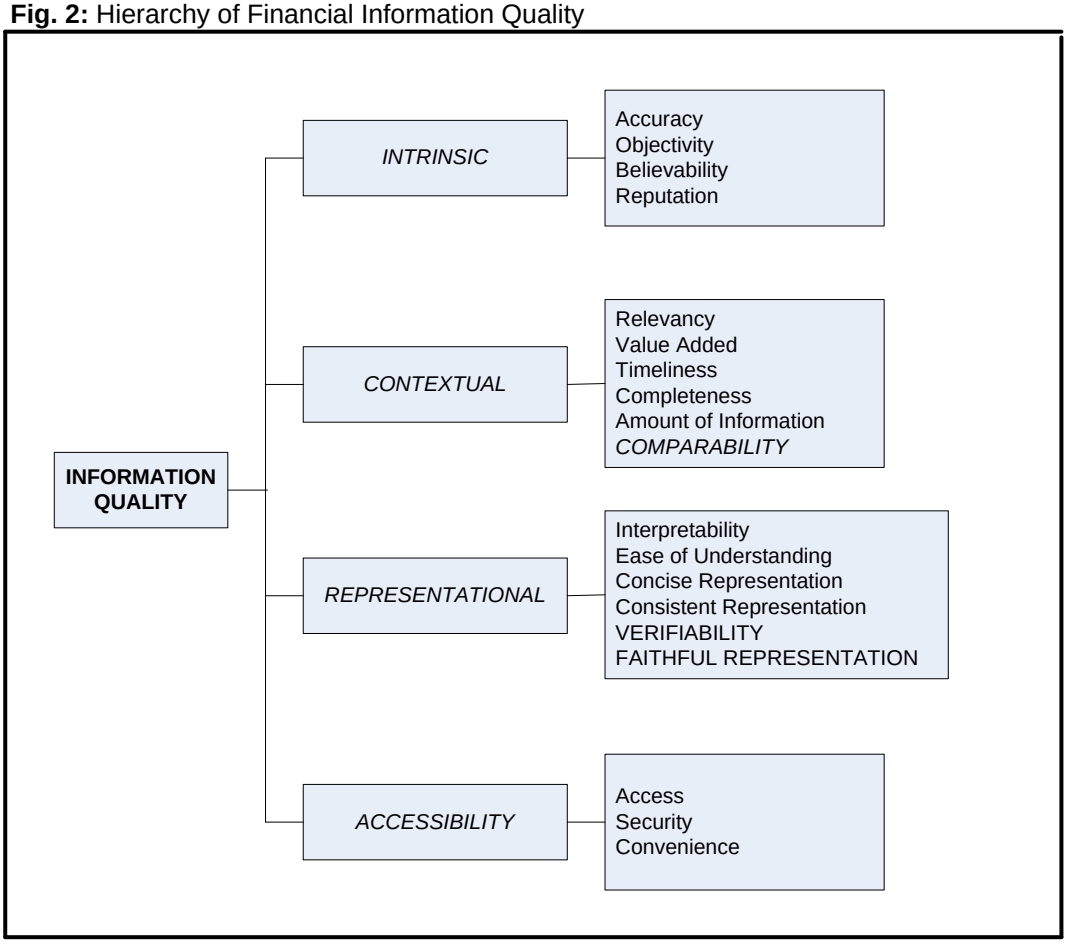
When compared to Wang and Strong's IQ attributes, IASB and FASB's reports share the most of the attributes in common. The differences occur in faithful representation, verifiability and comparability.

*Faithful representation:* Financial statements and reports represent economic phenomena in words and numbers. To be useful in financial reporting, information must be a faithful representation of the economic phenomena that it purports to represent. Faithful representation is achieved when the depiction of an economic phenomenon is complete, neutral and free from material error (IASB and FASB, 2010).
*Verifiability:* Different knowledgeable and independent observers could reach consensus (IASB and FASB, 2010). The consensus mentioned here doesn't mean a complete agreement. A high degree of consensus among independent measurers using the same measurement methods is the main motto underneath (FASB, 2008).

*Comparability:* The quality of information that enables users to identify and understand the similarities in and differences between two sets of economic phenomena (IASB and FASB, 2010).

With the explanations mentioned, IQ has various dimensions. Especially from the perspective of financial IQ the researchers and regularity parties have indicated specific dimensions for financial IQ. When the characteristics presented in IASB and FASB statements and dimensions in Wang and Strong's research combined we can form a common hierarchical structure for financial IQ. Fig. 2 illustrates the hierarchical structure for financial IQ.

**Fig. 2:** Hierarchy of Financial Information Quality

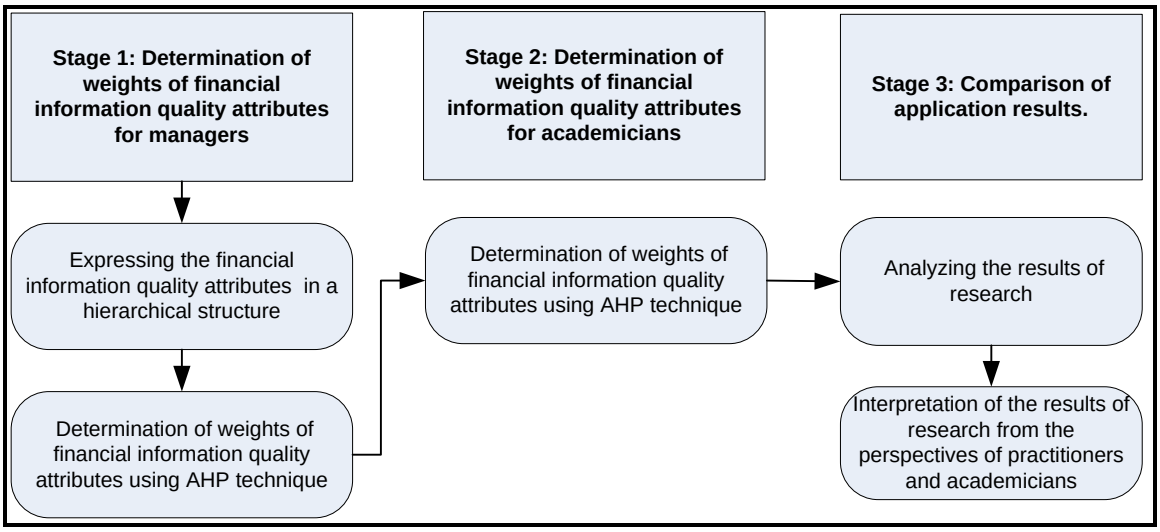



Adapted from Richard Y.WANG and Diane M.STRONG, "Beyond Accuracy: What Data Quality Means to Data Consumers?", **Journal of Management Information Systems,** Vol. 12, No.4. 1996, p.20;***FASB***, "Statement of Financial Accounting Concepts No. 2: Qualitative Characteristics of Accounting Information", May 1980, Revised 2008; ***IASB*** & ***FASB***, "Conceptual Framework For Financial Reporting: The Objective of Financial Reporting and Qualitative Characteristics and Constraints of Decision-Useful Financial Reporting Information", October 2010

## *5. Methodology*

The main concern of this study is to find out if there is a difference between the academicians' view who study in the field of finance and accounting and the practitioners' view within information quality. First group is studying and lecturing the issues about financial information and its attributes and the other group is dealing with creating, securing, using and audition of financial information. What does information quality means for these groups? Is the importance of attributes of information quality differ for these groups? To find these answers Analytic Hierarchy Process technique and Spearman Rank Correlation test is applied. Figure 3 shows the road map of this study;

**Fig.3:** Road Map




### 5.1. Analytic hierarchy process (AHP)

The AHP is developed by Saaty (1980), is a well known multiple criteria decision making technique. Because of its simplicity, ease of use and flexibility (its ability to handle both qualitative and quantitative judgement inputs) AHP has become a common tool for decision-making. AHP has been applied worldwide to help decision makers in decision context across both the public and private sectors (Zopounidis and Pardalos, 2010). AHP is a powerful decision making tool in order to determine the priorities among different criteria and also gives the advantage of ranking choices in the order of their effectiveness in meeting conflicting objectives (Işıklar and Büyüközkan, 2007). The technique can take into account both tangible and intangible aspects which give the advantage of making decisions with decision makers' experience, knowledge. AHP has several steps;

*Step 1: Define the problem and Structure the decision hierarchy*
In the first step the problem is defined and the problem is divided into sub-branches that will become sub-hierarchies. The AHP structure comprises goals, criteria (evaluation attributes) and alternatives. Each branch is then further divided into an appropriate level of detail (Parent criteria to sub criteria). At the end, the unstructured problem is transformed into a manageable problem under the form of a hierarchy.

*Step 2. Construction of pairwise comparison matrix*
Pairwise comparison matrix are built in this step. These pairwise comparisons are made for all factors to be considered. A relative weight to each criteria is assigned, based on its importance within the node(goal, criteria, sub criteria) to which it belongs. Each element in the upper level is used to compare the elements of an immediate lower-level(the alternatives are compared with respect to the criteria, the criteria are compared with respect to the goal). The comparison is qualitative and easy to perform (Podvezko, 2009).

Each of these judgments is assigned a number on a scale which is founded by Saaty(Table1).

**Table 1:** The numerical assessments and their definition (Saaty, 2001)

| Numerical Assessment | |
|---|---|
| 1 | Equal importance |
| 3 | Moderate importance |
| 5 | Strong importance |
| 7 | Very Strong importance |
| 9 | Extreme importance |
| 2,4,6,8 | Intermediate values of importance |

After all the pairwise comparison is done, the matrix having the judgements is completed. $P_{ij}$ is a number drawn from the fundamental scale and express numerically the relative dominance relationship between the element "i" and element "j" with respect to an element in the upper-level.

$$P = \begin{bmatrix} p_{11} & p_{12} & \cdots & p_{1n} \\ p_{21} & p_{22} & \cdots & p_{2n} \\ \vdots & \vdots & & \vdots \\ p_{n1} & p_{n2} & \cdots & p_{nn} \end{bmatrix} = \begin{bmatrix} \frac{w_1}{w_1} & \frac{w_1}{w_2} & \cdots & \frac{w_1}{w_n} \\ \frac{w_2}{w_1} & \frac{w_2}{w_2} & \cdots & \frac{w_2}{w_n} \\ \vdots & \vdots & & \vdots \\ \frac{w_n}{w_1} & \frac{w_n}{w_2} & \cdots & \frac{w_n}{w_n} \end{bmatrix} \quad (1)$$

*Step3: Consistency Test*

In this step a Consistency Ratio (CR) is calculated to measure "how consistent the judgements have been during the evaluation phase". If the matrix P is consistent the elements of the columns(and rows) of a consistent matrix will be proportional and will satisfy $p_{ij} = {}^{w_i}/_{w_j} = {}^{1}/_{p_{ji}}$ and $p_{ij} = 1$ with i,j,k=1,2,…n.

The inconsistency index/(CI) and consistency ratio(CR) are calculated by the equations;

$$CR = \frac{CI}{RI} \quad (2)$$

In this equation RI is the random consistency index. Random consistency index has the average consistencies for the matrixes that are randomly generated. These values are given in Table 2 (Saaty and Vargas, 2001).

**Table 2: Average Random Consistency Index(R.I.)**

| Order | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| R.I. | 0,00 | 0,00 | 0,52 | 0,89 | 1,11 | 1,25 | 1,35 | 1,40 | 1,45 | 1,49 |

Consistency index is calculated from the equation.

$$CI = \frac{\lambda_{max} - N}{N-1} \quad (3)$$

Where $\lambda_{max}$ is the largest eigenvalue of matrix P. Some amount of inconsistency is allowed but if the CR is much in excess of 0.1 the judgements should be untrustworthy. In this case the decision maker should return to step 2 and revise his/her judgements.

*Step 4. Calculation the weight of each criteria*

The eigenvalues of matrix P should be calculated which would give the relative weights of criteria. The relative weights obtained should verify;

$$P.W = \lambda_{max}.W \quad (4)$$

In this equation P represents the pair wise comparison matrix, W eigen-vector and $\lambda_{max}$ is the largest eigenvalue. Before the calculations the comparison matrix has to be normalized by dividing each column by the sum of the entries of the regarding column. If there are elements in the higher levels of the hierarchy, the obtained weight vector is multiplied with the weight of coefficients of the elements of the higher levels until the top of the hierarchy (Işıklar and Büyüközkan, 2007). Finally overall priorities for alternatives are acquired.

*5.2. Spearman's rank-correlation test*

Spearman's rank correlation coefficient is one of the measures that represent the degree of dependence between two random variable (Gaisser and Schmid, 2010). Spearman's rank correlation can be used to ascertain the presence of association between ranks obtained from academicians and managers. Srinivasa and Pillai (1999) used Spearman's rank correlation to compare the ranks achieved by multiple criteria decision making methods. İç and Yurdakul (2010) also used this method in the evaluation of the similarity of the rankings of the firms.

In our study Spearman's rank-correlation test is applied to prove the significance of the difference between the academicians' and practitioners' results. In this test the null hypothesis is "$H_o$: There is no similarity between two rankings" where the alternative hypothesis is "Two rankings are similar". Z statistics is calculated from the equation (5) and (6) and compared with Z value (İç and Yurdakul, 2010). This value corresponds to critical Z value at the level of α=0,05. If the computed test statistics is greater than 1,645 the null hypothesis is rejected.

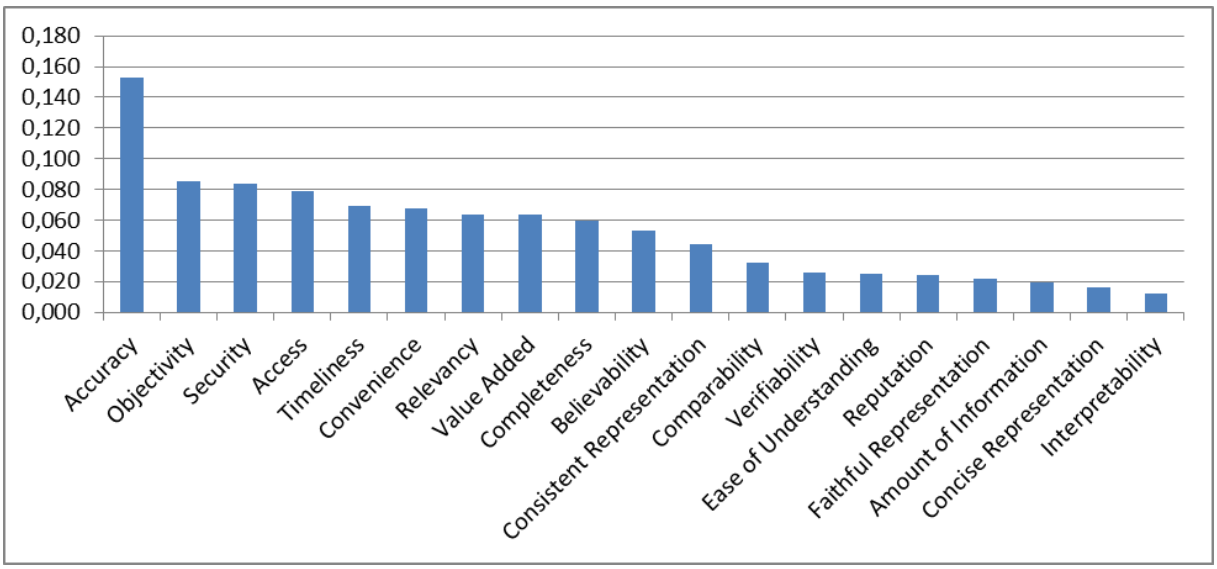
$$r_s = 1 - \left[\frac{6.\sum_{j=1}^{K}(d_j)^2}{K.(K^2-1)}\right] \quad (5)$$

$$Z = r_s\sqrt{(K-1)} \quad (6)$$

## 6. Results

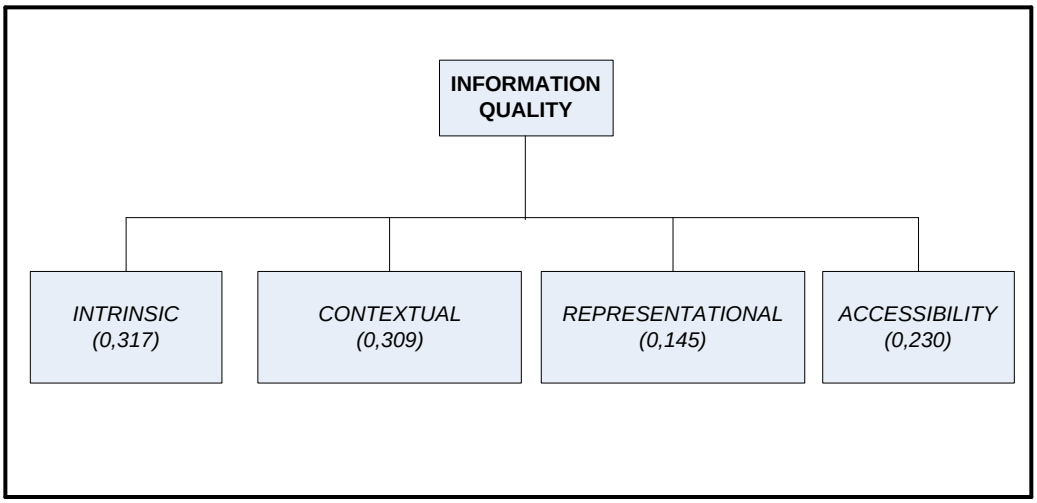
Determining the weights of attributes, the opinions of the experts (in this case the experts are the accounting-finance academicians) are gathered and analyzed for calculating individual priorities in the software Expert Choice. For the second step of the process geometric mean is calculated for aggregating of individuals' priorities for achieving for group decision. On the other hand practitioners' data is taken from our previous study (Karagül and Özdemir, 2010).

**Fig.4:** Academicians' Rankings for Financial Information Quality




As seen in Figure 4, according to the academicians, the most important sub-criteria for financial information quality is "accuracy". Following accuracy, objectivity and security take second and the third ranks. This ranking as whole shows that the academicians focus on the sub-criterias as the attributes of intrinsic criteria. Figure 5 shows the contributions of the criteria to financial information quality.

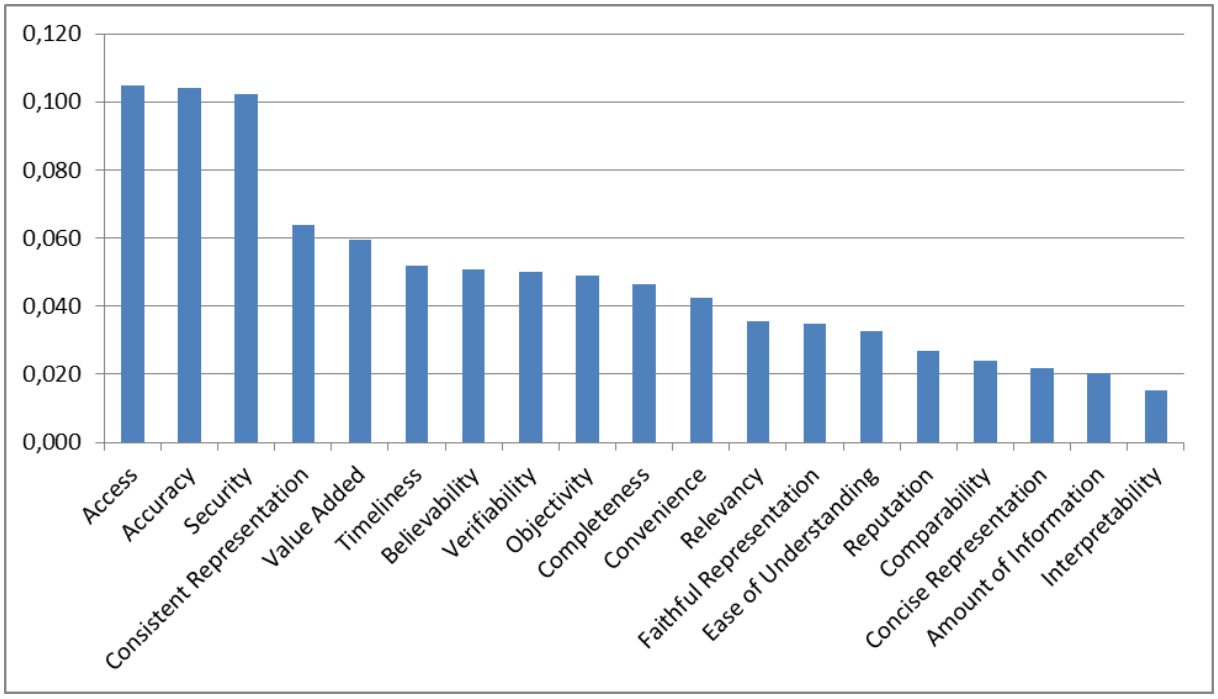
**Fig.5:** Weights of the Criterias for Academicians




Here the intrinsic criteria has the most contribution (0,317) to financial information quality, where the contextual (0,309), accessibility (0,230) and representational (0,145) follow.

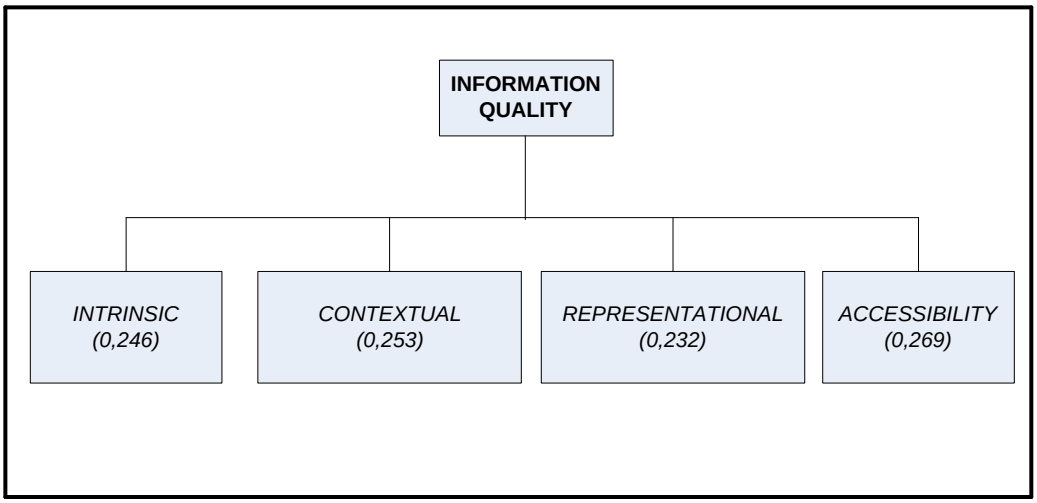
From the perspective of the practitioners' access, accuracy and security are the most important sub-criterias for financial information quality.

**Fig.6:** Practitioners' Rankings for Financial Information Quality




This ranking can be interpreted as the practitioners focus on sub-criterias as the attributes of accessibility criteria. Figure 7 shows the contribution of criteria to financial information quality.

**Fig.7:** Weights of the Criterias for Practitioners




As shown above, the accessibility criteria have the most contribution (0,269), where the contextual (0,253), intrinsic (0,246) and the representational (0,232) follow.

To find out if there is a significant difference between rankings of sub-criterias of the two groups, Spearman Rank Correlation Test is applied. Table 3 shows the results.

**Table 3:** Spearman Rank Correlation Test Results

**Correlations**

| | | | Aca1 | Bank1 |
|---|---|---|---|---|
| Spearman's rho | Aca1 | Correlation Coefficient | 1,000 | ,800** |
| | | Sig. (2-tailed) | . | ,000 |
| | | N | 19 | 19 |
| | Bank1 | Correlation Coefficient | ,800** | 1,000 |
| | | Sig. (2-tailed) | ,000 | . |
| | | N | 19 | 19 |

**. Correlation is significant at the 0.01 level (2-tailed).

According to the results, correlation is significant at 0,01 level. This means that the null hypothesis is rejected and the alternative hypothesis "two rankings are similar" is accepted.

## *7. Conclusion*

This paper discussed on the question whether the perceived importance of attributes of financial information quality between two separate groups differs from each other. As the results indicated, there is no statistically significant difference between the opinions of two groups. For the academicians, accuracy, objectivity and security are the top three important financial information quality attributes where access, accuracy and security are top three for the practitioners. This ranking showed that two out of top three attributes are the same for the groups. The ranking of the remaining attributes showed some differences but these differences are not statistically significant.

Though perceived importance of attributes of the quality of financial information varies from person to person, it is expected that people's opinion may be similar according to their field of study and occupation.

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