

# Strategic information quality utilizing the House of Quality

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## Abstract

*Living in the Age of Knowledge means living in search of innovation. That is, quality information and high valued added knowledge that can lead companies and individuals to the spotlight in a highly competitive and globalized world. Information is considered to be raw material for creating knowledge, which in turn, adds value to organizations, promotes innovation and puts the spotlight on organizations. For this reason, the objective of this study is to use a tool to analyze the quality of organizational strategic information in two phases. In the first phase, data and sources will be assessed; and in the second phase of the tool, strategic information and information guidance practices will be analyzed. Thereby, the study provides analyses of an organization a step-in advance, so as to improve its processes and tools to truly transform its strategic information into competitive advantage.*

**Keywords:** Information Quality; House of Quality; organizational strategic information.

## 1. Introduction

Living in the Age of Knowledge means living in search of innovation. That is, quality information and high valued added knowledge that can lead companies and individuals to the spotlight in a highly competitive and globalized world.

As punctuated by Fialho et al (2010), this is the era where information and knowledge become “competitive weapons.” Thus, organizations must be focused on building their knowledge base.

Passos (1999, p.59) says that companies are characterized as “socio-technical [...]: socio, referring to a set established social relationships [...], and technical, referring to the body of knowledge, coded or not, that leads human beings to act”. Therefore, managing knowledge which is implanted within the organization will allow existing strategic information to be coded, organized, stored, and reutilized. Further, new knowledge may be developed based on this body of knowledge, granting the organization competitive advantage.

Introduced in his work called “Knowledge Management”, Terra (2000) presented seven characteristics that organizations must have for managing knowledge: organizational culture; strategy and high management; organization and work processes; policies and practices for managing human resources; information and communication systems; performance evaluations, and hands-on learning.

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According to Fialho et al (2010, p.43), “information is a necessary means or source for extracting and building knowledge, which, changes through new contributions or restructuring.” Guaranteeing adequate technology for storing, sharing, and recovering knowledge is as important as certifying that it will suffer no semantic loss. Knowledge must be conceived, stored, and shared alienated from the various contexts in which it travels; also, it should be independent from the deliverer or receiver who will use it (GOMEZ, 1993).

Santos and Valentim (2015) consider that organizational information, that which involves business development, must be properly managed. It is the foundation for new product development, improvement of quality and productivity, better services offered, and the guarantee for the most accurate decision making. Woiciekovski and Pereira (2015) argue that regardless of the type innovation (product, process, or service), for a company to be successful it is necessary to identify the opportunity and understand the strategic information that will support the implementation of this innovation. In the same manner, Teixeira and Valentim (2016) point out that once an organization has analyzed its data and information and filtered strategic information, it will be possible to add value and generate knowledge that will allow for improvements for the organization and implantation of innovation.

Leal (2012, p.34) discusses services quality and highlights that “companies are directed towards the valuation of intangible assets, those which enable them to be directly connected to clients, defining their needs, targeting new markets, innovating and raising product quality.”

Considering what was previously exposed and what Jabar and Alnatsha (2014, p. 1) punctuate, that “quality of knowledge is a matter that needs to be brought to light in order to guarantee the effectiveness of knowledge management,” the following questions comes to light: how can organizational strategic information be analyzed using the House of Quality?

## **2. Information Quality and the House of Quality**

Sirihal and Lourenço (2002) affirm that information and knowledge have been approached in different manners. While scientific areas develop the concept of information, the humanities area, in turn, points to information as raw material for knowledge, considering both to be competitive instruments for organizations.

Authors such as Prusak and Davenport (2003) and Uriarte Junior (2008) make a distinction among data, information, and knowledge. The first, is symbols without context; the second, symbols with context; and the third, comprehends pattern recognition and its implications on information, respectively.

Obtaining information quality in hypercompetitive economic times, propelled by value added to intangible assets, reduces uncertainties and costs of poor quality related to decision making. For Bazzotti and Garcia (2007), decisions made with precision lead to company success, and they are obtained through the utilization of strategic information. Expanding on the importance of information quality for organizations, Kandari et al (2011) warns that concern about information quality must be present in every aspect of business.

Paying attention to quality of information is just as important as comprehending what it means. Therefore, Juran (1990, 1993) and Crosby (1979) define quality information as that which is fitness for use, that is,

that which efficiently meets the needs of those who use it (PAIM et al., 1996; CALAZANS, 2008, ALMEIDA, 2009).

Considering information to be a product and therefore having measurable characteristics, the dimensions of information quality are studied by several authors (WANG and STRONG, 1996; WANG et al., 1998; NAUMANN and ROLKER, 2000; EPPLER and MUENZENMAYER, 2002; LEE et al., 2002; ALMEIDA, 2009; LEE and HAIDER, 2011; OSTROWSKI, 2012; FILIERI and MCLEAY, 2013; NASUTION and ALBARDA, 2013; JABAR and ALNATSHA, 2014; AYYASH, 2015; ZARRAGA-RODRIGUEZ and ALVAREZ, 2015). Although there are variations in how they are presented by each author -- sometimes grouped into categories, and at other times presented individually being separated into subcategories as characteristics -- the most prominent dimensions of information quality are: completeness, timeliness, accuracy, accessibility, relevance, reliability and security.

Understanding the importance of organizational strategic information and the dimensions that may guarantee its quality, it is necessary to evaluate its current conditions within the organizations, find gaps and develop enhancements plans. For this process, total quality management tools have been adapted by authors and several other support tools have been developed.

The Quality Matrix, also called House of quality due to its format, is one of the total quality management tools that may contribute to organizational information quality. The development of this matrix is one of the steps in Quality Function Deployment (QFD). It aims to link client needs to technical prerequisites developed by specialist, improving information visibility and ensuring quality at the conception of a product project (OAKLAND, 1994; CHENG et al., 1995; AL-HAKIM, 2004; LIN et al. 2011) Aiming for quality, QFD and the House of Quality are applied in industry, agribusiness, services, as well as in organizational processes. Many of these applications already use other tools in conjunction with QFD, targeting improvements. Diffuse logic has been present in a variety papers that discuss the application of QFD, and it has become an important key term for researching QFD application.

In the search for the correlation between the terms QFD and Information Quality, authors (AL-HAKIM, 2004; PINTO, 2006; WANG et al., 2008; LIN et al. 2011; HAIDER and LEE, 2012) have been adapting QFD and House of Quality in different manners to evaluate information quality. Research they performed has demonstrated that advancements have developed in this field of study. Their findings show that giving proper attention to the needs of the users of this information facilitates the management process and increases assurance in decision making processes, ultimately favoring business development through innovation of products and processes.

### **3. Information Quality and the House of Quality**

The goal is to adapt the House of Quality to verify the quality of strategic information, treating this information as a product. The Kaneko approach to QFD is used in the development of the House of Quality to evaluate the organizational strategic information here presented. Therefore, the first two phases were used in this adaptation period as shown in Table 1.

Table I. Phases of the approach to QFD used by Kaneko for adapting the House of Quality

<b>KANECO APPROACH</b>	Phase 1 Required Elements of Quality → quality
	Phase 2 Elements of Functions/Processes → Quality

Source: Authors (2016)

The House of Quality for Strategic Information Quality is composed of two phases and three matrixes (Figure 1). This proposed composition will allow the user of the tool to have a complete evaluation of the quality of the organizational strategic information. It will allow for the development of an improvement plan that will guarantee the quality of organizational strategic information, adding value to business and ensuring its maintenance and continuation by promoting innovation.

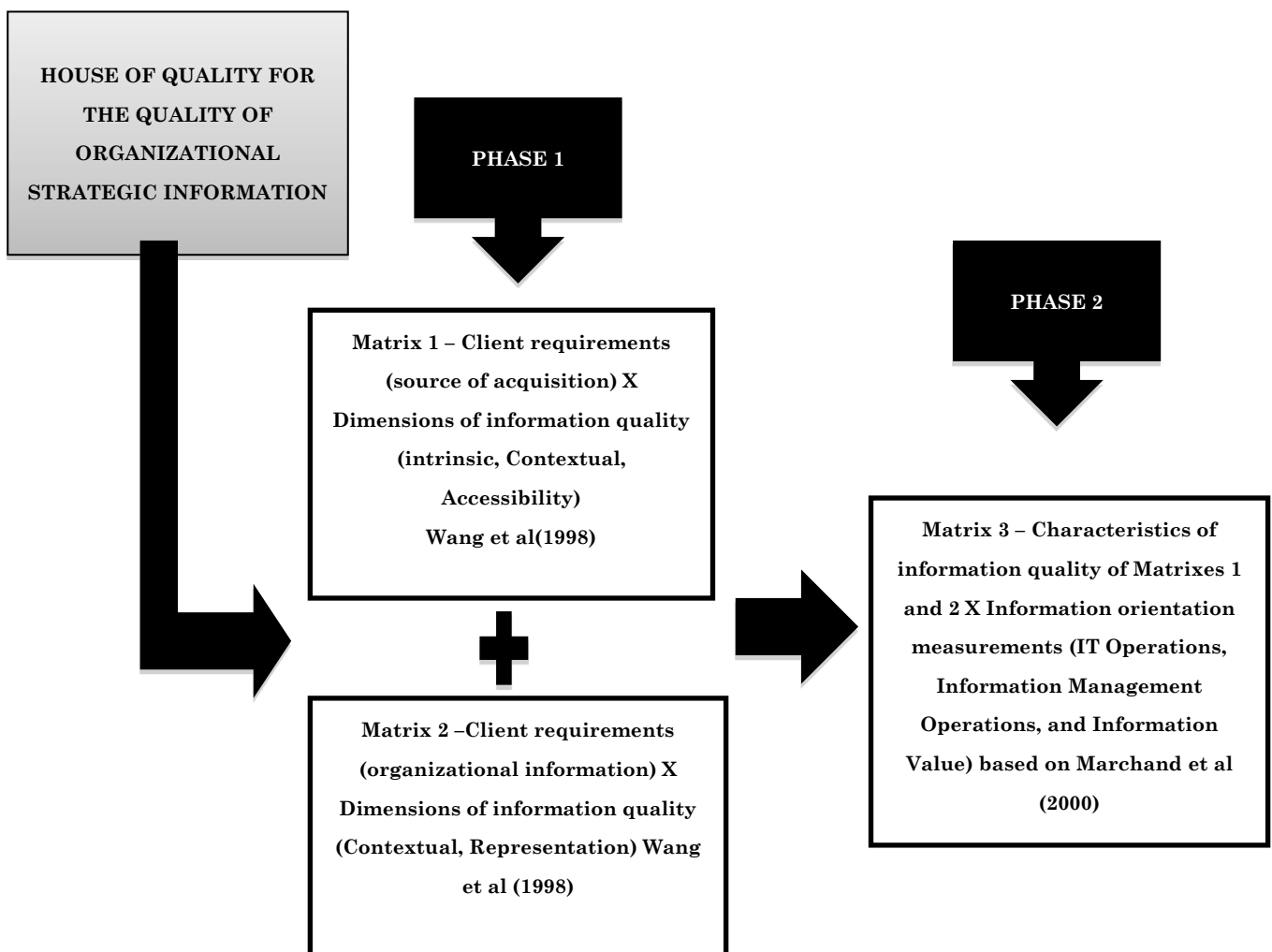


Figure I – House of Quality application steps for Strategic Information Quality

Source: Authors (2016)

In relation to the House of Quality adapted for Information Quality by Lin, Jing e Fang-Fang (2011), the model exposed in this study has and added column beside the matrix which shows the level of importance of each identified piece of information considered by the client to be strategic, presented in Figure 2

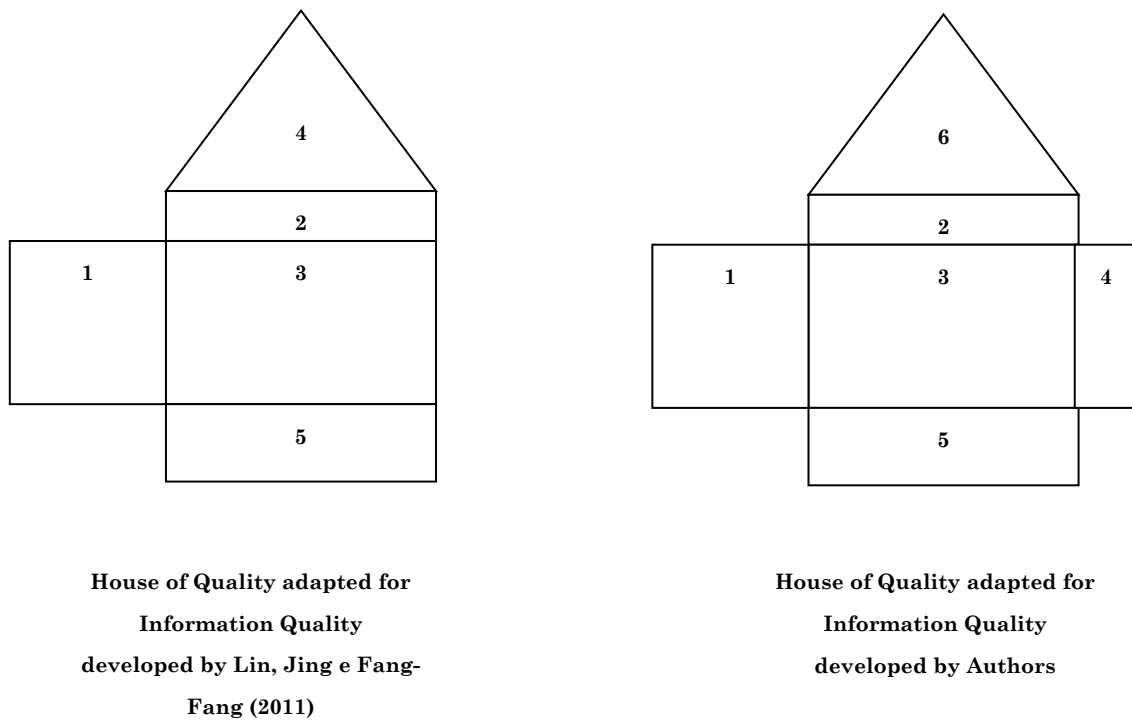


Figure II- House of Quality Structure applied Information Quality  
Source: Authors (2016)

The House of Quality for Strategic Information Quality holds the following structure:

1. Left wall: shows strategic information identified together with the client.
2. Maximum limit: shows dimensions of information quality in the first two matrixes, and in the third, guidance practices for information.
3. Center: shows matrix of relation between strategic information and dimensions of information quality in the first two matrixes; in the third, the matrix of relation between dimensions of information quality used in the first two, and in the third presents guidance practices for information.
4. Extreme right wall: shows degree of importance of strategic information as related per the client in the first two matrixes; the third matrix relates the result of the information quality presented at the bottom (5) of the previous matrixes as a degree of importance.
5. Floor: shows value obtained by the total sum of each dimension of the information quality evaluation, where gaps may be identified.
6. Ceiling: shows interrelations between technical requirements, contributing significantly to the final analysis.

For correlations with client requirements, the House of Quality for Strategic Information Quality uses in the first phase fourteen dimensions divided into four categories that address intrinsic characteristics of information: its context, its accessibility and its representation described Wang e Strong (1996), as seen in table 2. According to Bentancourt (2015), authors Wang and Strong (1996) define information quality as “adequacy for use.” Further, in a study focused on marketing, they aimed to understand consumer needs and build a hierarchical relation of such needs.

Table II. Characteristics of Information Quality

Categories	DIMENSION
INTRINSIC	Free of error
	Credibility
	Objectivity
CONTEXT	Completeness
	Current
	Value added
	Relevance
REPRESENTATION	Comprehensibility
	Interpretability
	Conciseness
	Conscientious representation
ACESSIBILITY	Availability
	Ease of use
	Safety

Source: Based on Strong et al. (1997), Lee et al. (2002), Bentancourt (2015)

To clarify the relation between dimensions of information quality and information management practices, the measures of information orientation (Table 3) were chosen to be used in the adaptation of the third matrix. These were based on Marchand et al. (2000) (IT practices, information management and management of information value), and demonstrate the relation between business performance and information potential.

Table III. Guidance for Information management

Information Technology Practices	Operational
	Process
	Innovation
	Management
Information Management Practices	Comprehension of business
	Collection of information
	Organization of information
	Information processing
	Information maintenance
Competitive value of information	Integrity
	Formality
	Control
	Sharing
	Transparency
	Proactivity

Source: Marchand et al (2000)

In the first phase (Phase 1) the House of Quality is divided in two instances, both of which correlate client requirements to information quality. The first matrix shows the relation to be more precise between sources of client requirements and the characteristics of information quality related to its availability and acquisition method. The following step is the second matrix. It shows the relation of client requirements and characteristics of information quality that is related to context and method of presentation, as seen on Figures 3 and 4.

Information	Source	Quality Dimensions							Degree of importance	
		INTRINSIC			CONTEXT		ACCESSIBILITY			
		Free of error	Credibility	Objectivity	Completeness	Current	Availability	Ease of use		Safety
Weighted sum of information quality		0	0	0	0	0	0	0	0	0,00
Information Quality (%)		#####	#####	#####	#####	#####	#####	#####	#####	100%

Figure III - Matrix 1 of Phase 1  
 Source: Authors (2016)

Strategic Information	Quality Dimensions						Degree of importance
	CONTEXT		REPRESENTATION				
	Added value	Relevance	Comprehensibility	Interpretability	Conciseness	Consistent Representation	
Weighted sum of information quality		0	0	0	0	0	0
Information Quality (%)		#####	#####	#####	#####	#####	#####
							100%

Figure IV - Matrix 2 of Phase 1  
 Source: Authors (2016)

In order to find the values of importance of each piece of strategic information suggested by the clients for the mission, vision and value of the organization in question, the suggestion is to utilize a questionnaire



that has a semantic differential scale and uses arithmetic averages of the answers found. Understanding the level of importance allows for obtaining a focus measurement, a measurement that demonstrates the impact of a given attribute during decision making (SAMARTINI, 2006). The second construction phase of the House of Quality for evaluating organizational strategic information presents a matrix that relates information quality dimensions of previous matrixes to organizational information management practices, as seen in Figure 5.

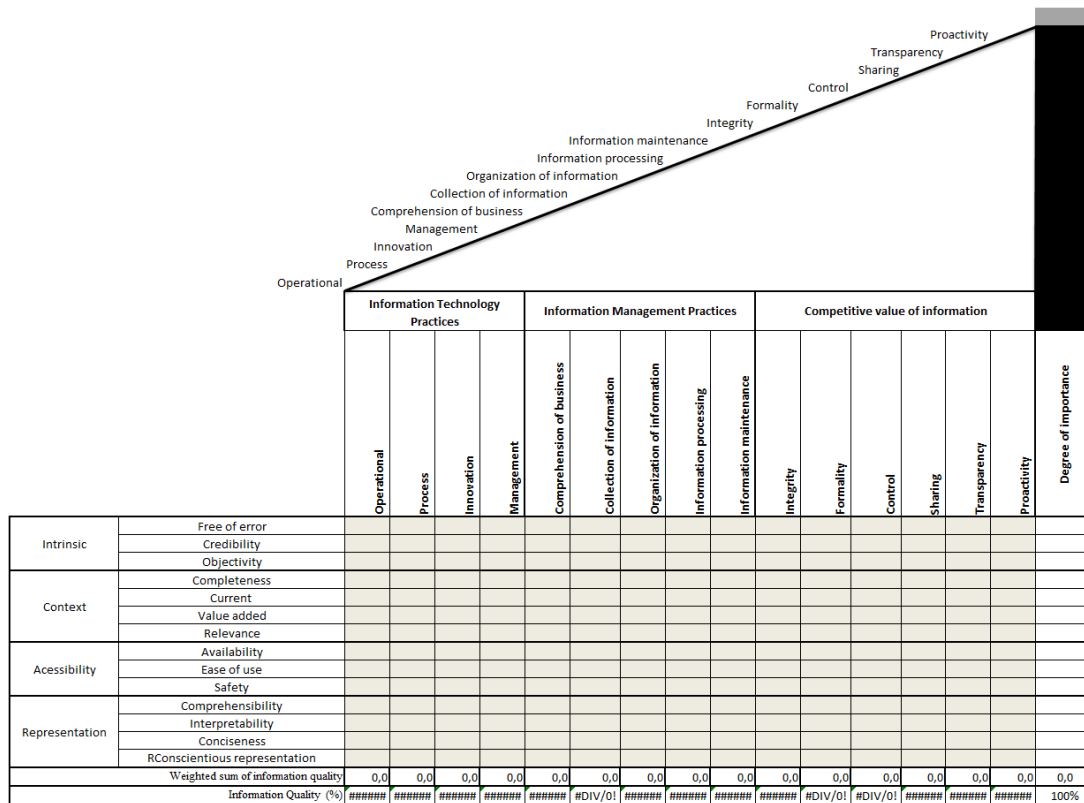


Figure V - Matrix of Phase 2  
Source: Authors (2016)

In this matrix, the values found as a weighted sum of information quality in previous matrixes is attributed as a level of importance for information quality dimensions.

### 4. Conclusion

According to Fialho et al (2010), information is the raw material necessary for constructing knowledge, being that both information and knowledge are competitive tools for organizations that work in the intelligence market. Especially for service and technology-based companies, knowledge is an intangible asset of the organization, and it is essential in promoting competitive advantage and innovation (ANGELONI and FERNANDES, 2000).

Jabar e Alnatsha (2014) point out that the effectiveness of knowledge management is directly connected to the level of attention a company devotes to quality of knowledge. Further, understanding that information is the raw material necessary for knowledge, and that guaranteeing its quality will assure the company

quality knowledge and effective intelligence management. The objective of this study was to analyze the quality of organizational strategic information by applying House of Quality.

The basis of this study is strengthened when Zarraga-Rodriguez e Avarez (2015) call attention to the scarcity of research studies that relate information quality with its use at individual and organizational levels. Therefore, considering that the tool which was developed and exemplified during this study shows contributions to science in advancing studies that use the QFD methods and information quality, it also applies to studies on organizational knowledge and quality of organizational information.

Within the context of social development, this study offers contributions to organizations, and, consequently, to society around them. Since the possibility of evaluating and improving strategic information quality increases its development, it allows the company to comprehend the importance of knowledge management, incentive to innovation, and to have high value added to business.

Finally, the objectives of this study were met, for it was possible to adapt the House of Quality to analyze strategic information quality. Prusak e Davenport (2003) reiterate that the differences among data, information and knowledge must be clear so that organizations may direct their efforts appropriately. Also, this study was not limited by dimensions of information quality. The tool successfully advanced, separating analysis into information and source, strategic information and organizational knowledge, the last of which was obtained through information quality related to information practices and guidance. These steps allow for a deeper analysis and offers the organization a broader spectrum of options while developing a plan for improvements and quality.

In future studies, we suggest the proposition of tools that assist in identifying organizational strategic information to complement this current tool; bring advancements in results analysis; give the proposition of a tool that helps elaborate specific action plans for improving information quality; perform analysis of parallel cases using statistical analysis of the correlation between results and variables; and, finally, perform validation of the tool and develop a system that enhances its use for organizations.

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