Investigating the relationship between the information quality dimensions and ICT-Case study BYA Electronics-

دراسة العلاقة بين أبعاد جودة المعلومة وتكنولوجيا المعلومات والإتصال

دراسة حالة: *BYA* الكترونيك

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Abstract:

This paper investigate the relationship between ICT and information quality dimensions, the transition of mostly of the firms toward digitalization provides the opportunity to explore how ICT can effects on information quality dimensions and on the quality of the whole organization system, In order to clarify this relationship, we used the SPSS program. Finaly we concluded that information quality leads to the quality of the system, and this is through the use of ICT.

Keywords : Technology; information; information quality; ICT.

JEL classification code : L15- O32

ملخص: تتلخص هذه الدراسة حول العلاقة بين تكنولوجيا المعلومات والإتصال وأبعاد جودة المعلومة، فالتحول الكبير الذي تعرفه منظمات الأعمال نحو الرقمنة يمنح لها الفرصة لإستكشاف مدى تأثير التكنولوجيا الحديثة على جودة المعلومة ودورها في تحسين جودة نظام المؤسسة، ولتأكيد مدى دور تكنولوجيا المعلومات والإتصال في تحديد جودة المعلومة على مستوى المؤسسة محل الدراسة، تم استخدام برنامج SPSS، وخلصت الدراسة إلى أن جودة المعلومة تؤدي إلى جودة النظام من خلال تبني واستعمال تكنولوجيا المعلومات والإتصال.

الكلمات المفتاحية: تكنولوجيا؛ معلومات؛ جودة المعلومات؛ تكنولوجيا المعلومات والإتصال.

تصنيف L15- O32:JEL

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Introduction :

Competition environment has enhanced the adoption and the use of ICT in firms and organization aim to increase the performance of

their total quality management system, in order to provide better quality of products and services.

The pressures of competition puches firms to focus on quality improvement, in order to assure the survival of the organization for long term. So the ICT is an asset for enterprise to increase quality. The quality of the organization system depends to many factors including the quality of the information that is the essence of any system, there is no system without data and information, which have to be efficient in order to maintain the sustainble competitive advantages, the quality of the information that needs the organistaion has dimensions which will be detailed in this paper. And in today's highly competitive market, information and communication technologies are widely adopted and used to facilitate the communication.

The aim of this paper is to study and investigate the relationship between the information and communication technologies and the quality of the information. So the main question of this paper that is there a relationship between ICT and information quality?

In order to investigate the relationship between ICT and quality of information of each dimension, and according to this aim, and in order to find answers to the question above, two main hypotheses have been formulated so as to investigate at any significant deference at 95% confidence level as follows.

H1: there is a relationship between ICT and information quality dimensions at 5 percent level of signification.

H2: there is an impact of ICT on information quality dimensions at 5 percent level of signification.

The null and the alternative hypothesis of each main hypothesis.

H1.0: there is not a significant difference in the relationship between ict and information quality dimensions at 5 percent level of signification.

H1.1: there is a significant difference in the relationship between ict and information quality dimensions at 5 percent level of signification.

H2.0: there is not a significant difference between impact of ict on information quality dimensions at 5 percent level of signification.

H2.1: there is a significant difference between impact of ict on information quality dimensions at 5 percent level of signification.

In ordre to accomplish the objectif of the research, this study is devided in two parts, firstly we have to examine the research backround in this field focusing on the information quality dimensions that tackles this study, and in the second parts a case study at BYA Electronics a company in the field of electronics industries.

1. Literature review:

A lot of attempt has been devoted to examine the relationship between ICT and information quality dimensions; the effect of ICT on information quality has been studied by many researchers. ICT is each computer and telecommunication hardware that aid in processing, collection, and transmission of text, voice, and pictorial information.

On the other hand information is useful data that have been processed in such a way as to be meaningful to the person who receives it and to increase the knowledge of the person.

Information is data where relevance, purpose meaning is added and while helps in decision making and therefore is meaningful and useful. Information is data that is transformed (davenport, 1997, p288)

The information quality has been the subject of research since the mid 1980's, consensus is still not reached about the definition of the construct. The problem of insufficient information quality is widespread and is often cited as one of the major factors for the failure

of information systems, with increasing volumes and complexities of data resources, managing information quality has become an important success factor (Kluitmans, 2013, p12). we will explore those which have relationship with this paper. Most research about Information quality were in combination with system quality (DeLone and McLean, 1992, p75), and (Nelson, Todd, and Wixom, 2005, p220) and about knowledge management (Wu and Wang, 2006, p12), and many researches has been carried out about the field of information quality dimensions and attributes which have a direct impact on management quality, focused on the intrinsic, context based and representational views of information quality.

According to the aim of this study and to the data collected from the firm that we have chosen to do this case study and after a comprehensive literature review six attributes and dimensions of the information quality, accuracy, reliability, objectivity, traceability, timeliness, frequency, were selected to be studied and to represent the information quality in this firm, accuracy and reliability refers to the user's perception that the information is correct, stable and repeatable (Price, Neiger, and Shanks, 2008, p3), objectivity which is the degree of match between the information being supplied and information required for making decision, traceability which denotes the extent to which data are always presented in the same format and are compatible with previous data (Wang and strong, 1996, p20) And timeliness is the degree to which information is available on time for its intended use and is also up to date (Wang and strong, 1996, p25). And finally the frequency which denotes the level of output options that the system provides and the level the ease with which the system allows a user to navigate through various options (Price, Neiger, and Shanks, 2008, p3)

2. Case study :

BYA Electronics derives in fact from an older group, the Ait Yalla group, founded by Ait Yalla Hocine in 1945, this group invested in real estate, transportation and agribusiness and nowadays in various sectors, to know, electronics, the broadcast and professional, cable télévision, training. Located in the business area of Arzew, exactly in Ain el Bia, the industrial complex BYA consists mainly of four large production units:

- Electronics manufacturing unit.
- Electronics assembly unit.
- Mechanical unit intended for the manufacture of parabolic reflectors integrating 95% of the local raw material.
- Unit of manufacture of household electrical products.

These four unit all have production lines totally managed by a computer system, this have given BYA the ability to create a professional multimedia department that gives the country the opportunity to benefit in terms of audio-visual production, from the professional equipement of the world leader in this field namely Japanese SONY Professional, this has allowed BYA to establish itself as one of the best providers nationally and to realize several important markets like:

- A remote display system covering all the units of the Arzew industrial area (40 Km of optical fiber) on behalf of Sonatrach;
- An audio-visual production studio on behalf of the ministry of religious affaires;
- A tele display system at the SH-AVAL Oran headquarters;
- Studio equipement for sat info;
- Equipement for the DGSN;
- The equipement of almost 70% of the private agencies of communication in audio visual material.

4. Study methodology:

The main research objective is to assess the relationship between ICT and quality of information dimensions, and in order to accomplish this objective and to test the hypotheses formulated in this case below. The survey method was adopted and the questionnaire deemed most appropriate to conduct it and to collect necessary data for the research.

The statistical methods which have been used to analyze collected data and to test differences in the relationship between ICT and each information quality dimension. Descriptive statistics with measure of central tendency and hypotheses test using Pearson correlation to test the relationship between ICT and information quality dimensions.

4.1 Sample:

As we have shown above, this case study is aimed at BYA electronics, and about the population to be studied 50 employees was selected from 87 the whole number of the firm's effective, this sample was chosen according to the degree of their education. And the final population consisted at 30 employees (15 man and 15 women). In terms of the period was in may-juin 2019.

4.2 Survey:

In order to accomplish the objective of this research methodology, tools and techniques used are survey and SPSS which is the most popular tool, the research is deemed to help us to understand the role of ICT, and to accomplish our aim a clear steps of methodology will be taken to guide us.

After collection of the questionnaires just 30 employees have response all the questions. And tools of descriptive statistics are used to analyze the answers.

In total 36 respondents filled out the survey over a period of almost month. The sample was reduced by eliminating 6 respondents

who had not filled out more than a third of the survey.

4.3 Questionnaire:

In order to obtain necessary data for the study, the questionnaire contains twentyone questions divided on 7 axes, in each axis there was three questions focusing on one dimension of the information quality. In total there were six dimensions, and there were three questions to study the ICT axis. The (table 3) shows the responses according to the likert 3 scale.

The questionnaire is the most appropriate data collection, and it was necessary that the surveyed organization has a formel quality system so as to effectively assess the impact of ICT on information quality with respect to the sample. A total of 30 questionnaires were obtained.

After having collected data, the next step was to analyze it, the statistical methods which have been used are:

- Descriptive statistics;

- Test of reliability;

-Correlation analysis using Pearson's correlation coefficient including the test of normality of the sample.

To test the hypothesis and to evaluate the relationship between ICT and the different dimensions of the information quality proposed in the literature review. In the questionnaire completed by the participating the different questions were accompanied by 3 point likert scale, where 1 indicated slightly important, 2 important, and 3 very important. (Table 1) shows the interval and the description of each rank.

Table 1. the rank of importance 3 likert scale

Likert scale	Interval	Deference	Description
1	1.00 – 1.66	0.66	Slightly important
2	1.67 – 2.33	0.66	Important
3	2.34 – 3.00	0.66	Very important

Source: presented by researchers

5. Study results:

The sample of the research is described in (Table 2). Staff and percentage of the age, education level, work experience following by circles analysis using the SPSS version 22.

Table2: Descriptive statistics of sample

Caracteristics			Staff	Percentage
1	Age	<= 25	8	26,7
		26-30	9	30,0
		31-40	9	30,0
		41-50	4	13,3
		Total	30	100,0
2	Level of eduaction	High school	4	13,3
		Professional training	9	30,0
		University level	17	56,7
		Total	30	100,0
3	Work experience	<=5	19	63,3
		6-10	2	6,7
		11-20	3	10,0
		> 20	6	20,0
		Total	30	100,0

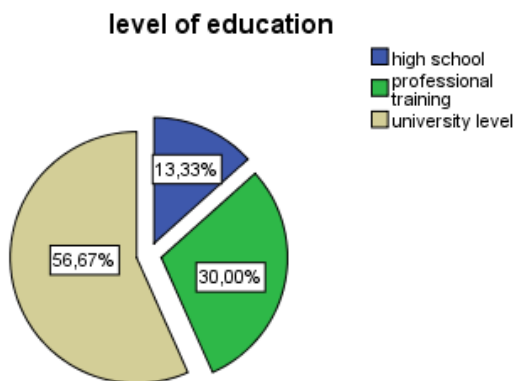**Source:** from Spsss using the collected research data

From (table 2) we can notice that most of the staff shosen in the sample are graduated from the university and the large percentage of the work experience is for them who have less than or equal to five years.
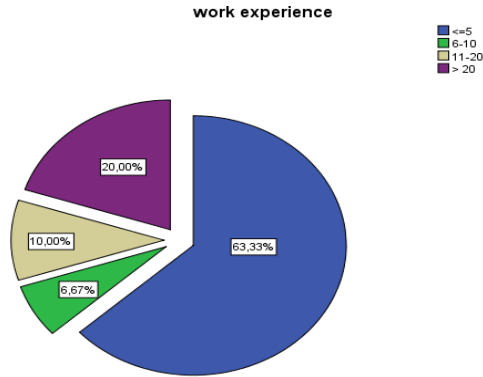
Figure 1: age percentage
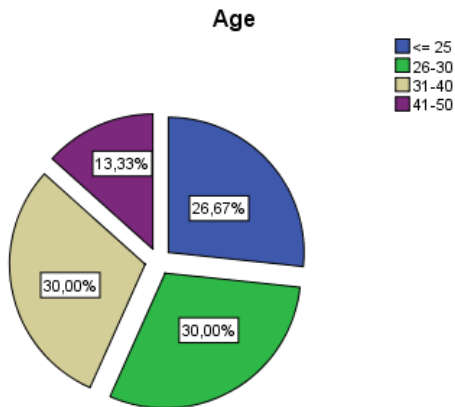
Source: from Spsss using the collected research data

Figure 2: level of education percentage

Source: from Spsss using the collected research data

Figure 3: work experience percentage

Source: from Spsss using the collected research data

5.1 Reliability test:

The cronbach's coefficient alpha was tested on all research's variable. Its value were 0.807 which indicate good consistency and reliability and that is acceptable for other analysis. The minimum acceptable level for the reliability coefficient is 0.7 (Nunnally, 1978, p245)

Statistics of reliability

Alpha de Cronbach	Number of elements
,807	21

Source: from Spsss using the collected research data

Table 3: Descriptive statistics of the questionnaire

Dimension	Questions		Slightly important	Important	Very important	mean	SD	Obs
Accuracy	Q1	N	00	00	30	3.000	0.000	Very important
		%	00.00	00.00	100.00			
Accuracy	Q2	N	00	7	23	2.77	0.430	Very important
		%	00.00	23.30	76.7			
Accuracy	Q3	N	00	10	20	2.67	0.479	Very important
		%	00.00	33.30	66.70			
Reliability	Q4	N	00	5	25	2.83	0.379	Very important
		%	00.00	16.70	83.30			
Reliability	Q5	N	3	20	7	2.13	0.571	Important
		%	10.00	66.70	23.30			
Reliability	Q6	N	8	14	8	2.00	0.743	Important
		%	26.70	46.70	26.70			
Traceability	Q7	N	00	18	12	2.40	0.498	Very important
		%	00.00	60.00	40			
Traceability	Q8	N	00	23	7	2.23	0.430	Important
		%	00.00	76.70	23.30			
Traceability	Q9	N	9	20	1	1.73	0.521	important
		%	30.00	66.70	3.30			
Objectivity	Q10	N	16	11	3	1.57	0.679	Slightly important
		%	53.30	36.7	10.00			
Objectivity	Q11	N	8	19	3	1.83	0.592	important
		%	26.70	63.3	10.00			
Objectivity	Q12	N	14	16	00	1.53	0.507	Slightly important
		%	46.70	53.3	00.00			
Timeliness	Q13	N	00	00	30	3.00	0.000	Very important
		%	00.00	00.00	100.00			
Timeliness	Q14	N	00	8	22	2.73	0.450	Very important
		%	00.00	26.70	73.30			
Timeliness	Q15	N	00	14	16	2.53	0.507	Very important
		%	00.00	46.70	53.30			
Frequency	Q16	N	00	00	30	3.00	0.000	Very important
		%	00.00	00.00	100.00			
Frequency	Q17	N	00	3	27	2.90	0.305	important
		%	00.00	10.00	90.00			
Frequency	Q18	N	00	13	17	2.57	0.504	Very important
		%	00.00	43.30	56.70			
ICT	Q19	N	00	00	30	3.00	0.000	Very important
		%	00.00	00.00	100.00			
ICT	Q20	N	00	6	24	2.80	0.407	Very important
		%	00.00	20.00	80.00			
ICT	Q21	N	00	13	17	2.57	0.504	Very important
		%	00.00	43.30	56.70			

Source: from Spsss using the collected research data

5.2 Statistics descriptive of each information quality dimensions:

First order analysis will be used to evaluate the extent of the use of ICT for each information quality dimensions. The descriptive statistics measure of central tendency, the mean for each dimension of the information quality and measure of dispersion using the standard deviation.

Table 4: Descriptive statistics of the sample

| Dimension	mean	SD	Description	weight	Rank
Accuracy	2.8111	0.22630	Very important	High level	2
Reliability	2.3222	0.48331	Important	Moderate level	4
Traceability	2.1222	0.33314	Important	Moderate level	5
Objectivity	1.6444	0.46265	Slightly important	Low level	6
Timeliness	2.7556	0.26164	Very important	High level	3
Frequency	2.8222	0.22715	Very important	High level	1
ICT	2.7889	0.25496	Very important	High level	/
Information Quality	2.4130	0.21177	Very important	High level	/

Source: from Spsss using the collected research data

From the (table 4) it can be clearly seen from the mean that the six dimensions are highly supported by ICT with the highest level of frequency and accuracy and the timeliness according to the 3 point likert scale, and about the reliability and the traceability which are moderately supported, just the objectivity its relationship with the ICT has a low level comparing to the others dimensions. That shows the difference between the impact of ICT on each information quality attributes.

5.3 Test of normality:

To test if the variables distribution is suitable to examine the hypothesis of the study, normality test is the statistical method that allow to know the type of the distribution of the sample for further analysis.

Figure 4: Test of normality
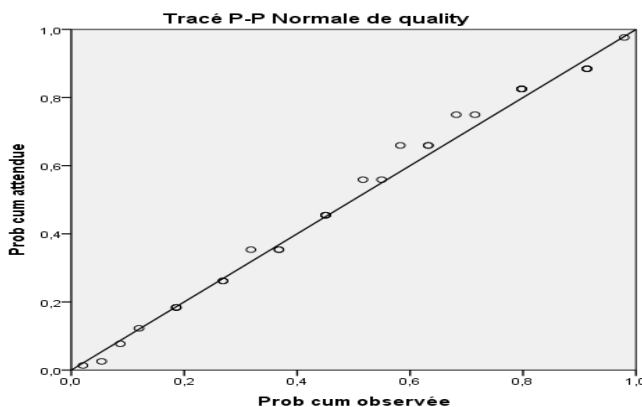
Source: from Spsss using the collected research data

The test in (figure 1) Shows that the variables follow normal distribution as it can see from the pp plot.

5.4 Correlation test :

In order to test the impact and the degree of the relationship between ICT and information quality and to test the hypothesis above, Pearson correlation coefficient allow as to know which hypothesis is accepted or rejected at any signification level 0.05, the results are in (table 4)

Table 5: Pearson correlation test

Dimensions	R	R²	sig	Null hypothesis
Accuracy	0.680	0.462	0.000	Rejected
Reliability	0.478	0.228	0.008	Rejected
Traceability	0.359	0.129	0.051	Rejected
Objectivity	0.186	0.035	0.324	Accepted
Age_info	0.578	0.334	0.001	Rejected
Frequency	0.653	0.426	0.000	Rejected
Quality_inf	0.701	0.491	0.000	Rejected

Source: from Spsss using the collected research data

As shows (table 5) the positive coefficient for all the dimensions provide for predictive validity. As the research aimed to investigate the relationship and the impact of ICT on information quality, (table 5) shows the result of correlation analysis, the positive coefficient for all the dimensions provides evidence that there is a relationship between ICT and information quality. We also observed that the accuracy, frequency and timeliness have the highest level, comparing to the reliability and traceability which are moderately influencing by ICT so the alternative hypothesis is accepted. And about objectivity the null hypothesis is accepted sig =0.324 is more than 0.05 with correlation coefficient equal to 0.186. About the quality of information, the coefficient of correlation is 0.701 and sig = 0.000 so the null hypothesis is rejected at any signification level 0.05. So, there is a strong relationship between ICT and information quality.

6. Conclusion:

As the research has shown there was a significant difference observed in the relationship between ICT and information quality and its dimensions, the paper shows also the major impact of ICT on accuracy, timeliness and frequency attributes that proves the effects and the importance of information quality and its relation with ICT in firms and organization that aims to improve their systems and to increase the quality of information which connect between the different department of the firm. And furthermore to take the right decision based on having the information that tells what is the right thing to do in the right time, this is one of the most important benefits of the use of ICT. In conclusion from the result obtained we observed that ICT could allow for better communication of information which would results in higher quality of organization system.

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