



## EXAMINING THE IMPACTS OF INFORMATION COMMUNICATION TECHNOLOGY ON QUANTITY SURVEYORS IN ABUJA, FCT

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### ABSTRACT

The research work examined the overall impacts of Information communication technology on Quantity Surveyors residents in the Federal Capital Territory, Abuja. The research was carried out using a mixed method approach (quantitative and qualitative). The research population for the quantitative data was the 569 registered in the professional regulatory body (QSRBN) register. Out of which 230 as the sample size was gotten using Glenn (2013) formulae. While the population for the qualitative data were the principal Quantity Surveyors in the construction industry. Using a stratified random sampling method, the collected data from the questionnaire were analysed using Relative Importance Index (RII) and Ranking method and the qualitative analysis was done using thematic and deductive analysis. The research found that the benefits of ICT to Quantity Surveyors are speedy exchange of information, providing an easy access to needed data, faster response to clients enquires, increase productivity through automated quantities and cost calculations and improving job presentation while the following were the negative effects on Quantity Surveyors: eye strain, neck pain, watery and dry eyes, blurred vision and headache Body pains, job distraction, headaches, and feelings of been overwhelmed from work overloads, the threat to project confidentiality, mistakes by the younger or inexperienced quantity surveyors. Keywords: *Effects of ICT on Quantity Surveyors, Information Communication Technology in the Construction industry, Impact of Information Communication Technology on Quantity.*

### 1 INTRODUCTION

The construction industry may be viewed as that sector of the economy that, through planning, design, construction, maintenance and repair, and operation, transforms various resources into constructed facilities (Ezeokoli *et al.*, 2016). The industry contributes to the economic development of any country, in Nigeria for instance; at the fourth quarter of 2016, it contributed about 3.41% to the total real GDP (National Bureau of Statistics, 2017). A construction process relies on the collaborative participation and contributions of different interdependent parties hence the great need to communicate. This makes the industry one of the most information-intensive industries (Chidebere, 2012).

The growth of the Information and Communication Technology (ICT) has had unquantifiable impact on business systems and processes, with the construction industry inclusive; this is showed by the yearly increase of ICT users (Oyediran & Odusami 2005, Akinagbe & Adelakun 2014). The need to increase staff productivity, gaining competitive advantage, reducing the burden of data processing, storage and dissemination as highlighted by Ezeokoli *et al.* (2016), as led to the gross acceptance of ICT in the industry.

Monideepa *et al.* (2014) noted that the implementation of ICT leads to effects that have a “dual nature”, the benefits on a side and negative reactions on the other side. The benefits were indicated to be enhancing productivity, improving accuracy and documentation,

enhancing effective delivery and improving time, cost and quality performance (Gambo, 2017). The negative reactions inferred from studies could be grouped into psychological, emotional, health and social. Thomee (2012) also noted decrease in learning, creativity, and critical thinking (Gerardi, 2017). Social: Personal invasion, uncertainties, information overload (Bucher *et al.*, 2012).

### 2 STATEMENT OF PROBLEM

The rise in the use of ICT in the workplace has undoubtedly produce favorable results as shown by several studies, but at the same time, there come challenges with the shift in paradigm because of lack of a proper adoption strategy. Studies revealing these side effects are emerging in other fields of human studies notably; health, social science, the communication profession, human and personal management, and administrations, with the construction industry not left out.

Tagurum *et al.* (2017) noted that there is a growing perception that rapid advancement in technology are responsible for inducing stress in our lives, thereby affecting performance and wellbeing. Akinbinu and Mashalla (2014) also observed that an increase in dependence on computers in the developed has led to the prevalent of Computer vision syndrome. Thomee (2012) highlighted that intensive ICT use has impacts on the mental health of its users, reporting sleep disturbance and symptoms of depression. Paul (2011)



remarks the summation of these effects as the human brain under a serious threat from the modern world.

Rimington *et al.* (2015) studied the effects of ICT on the social environment of construction project teams and the project outcome, and confirmed the existence of tensions and conflicts in the human-electronic and human-human communication, the eroding of the social skills in the work environment, the decrease in the social interaction among team members required to increase team performance, the loss of understanding of information passed due to the speedy and spontaneous nature of ICT tools and lastly the tendencies to be distracted from the job at hand, proposing that the increasing use of ICT will occur at the expense of soft system communication. The aim of this research therefore is to examine the overall impacts of ICT on Quantity Surveyors.

### 3 JUSTIFICATION

Several studies have been concerted on the adoption of information and technology tools, its impacts/benefits, and barriers to its full implementation; they include surveys conducted in New Zealand in 1997 (Doherty, 1997), Scandinavia in 1998 (Howard *et al.*, 1998), Canada in 2003 (Rivard *et al.*, 2004), Australia in 2005 and 2009 (Peansupap and Walker 2005, Brewer and Gajendran, 2009), in Construction Small and Medium enterprise in ,developing countries in 2005 (Lee and Egbu 2007), Turkey in 2009 (Isikdag *et al.*, 2009), Brazil in 2010 (Michaloski and Paula 2010), Sweden in 2007 (Samuelson, 2008), Malaysia in 2011 (Kareem and Bakar 2011), Singapore in 2003 (Hua, 2004), Taiwan in 2008 (Chien and Barthorpe 2010). All of these studies observed the high and increasing usage of ICT as against perceptions that the construction industry is slow to the ICT revolution, although they noted that the ICT was majorly used for accounting, documentation and information transmission, and not necessarily for professional practice, though the use of CADs and 3D is prevalent in the industry.

Summarily, studies on ICT carried out in the Nigeria construction industry, has largely been focused on assessment, implementations and innovations of ICT usages and also the impediments or reasons in the approach towards a full adoption of ICT in work practice, little however exists on the overall impacts on Quantity Surveyors, this indicate a gap in knowledge.

#### Significance of Filling the Gap

This research creates the awareness and provides understanding and guidance on the impacts ICT has on Quantity surveyors with a view to encourage the use and mitigate the negative effects, it will also improve the performance and skills of ICT users in the industry. The

recommendations of the study, if properly implemented, would benefits the Quantity Surveying profession and the construction industry at large.

### 4 RESEARCH METHODOLOGY

A survey design approach was employed in this research with the quantitative data gathered from the respondents using a questionnaire and the qualitative data through a semi-structure interview. The population for this research work was the 569 registered quantity surveyors residents in the Federal Capital Territory, Abuja. This number was arrived at through a formal online consultation from the Quantity Surveying Registration Board of Nigeria (QSRBN). The sample frame consisted of Registered Quantity surveying firms, Government Ministries and department of works, registered construction firms and consultant construction firms in Abuja.

Abuja was chosen as a case study in this context because it is the capital city of Nigeria, and with a high presence of construction activities.

In order to guarantee equal representation for each of the identified groups in the population, stratified random sampling method was adopted. The respondents were first categorised into different strata then randomly sampled.

Using Glenn (2013) formulae, a sample size of 230 quantity surveyors respondents was addressed based on the figure calculated using Glenn's (2013) formulae.

$$\frac{N}{1+Ne^2}$$

Where:

$n$  = Sample size

$N$  = Population size in the sample unit

$e$  = Level of precision which is +5% (0.05)

Table 1 shows the that 27% of the quantity surveyors worked in the Federal ministries, 18% worked in the various departments of works, 20% in private construction firms, 16% in Quantity Surveying firms, 19% private consultant construction firms under the questionnaire section, while the interview aspect showed that 20% of the quantity surveyors worked in the Federal ministries, 20% worked in the departments of works, 20% in private construction firms, 20% in Quantity Surveying firms, 20% private consultant construction firms.



**TABLE 1.0: QUESTIONNAIRE RESPONDENTS' DEMOGRAPHIC**

Respondents Place of Work	Questionnaire	Interview
Federal Ministries	55	2
Department of works	36	2
Private construction firms	40	2
Quantity Surveying firms	33	2
Private Construction consultant firms	38	2
<b>Total</b>	<b>202</b>	<b>10</b>

Table 2 shows that 26% of the quantity surveyors had 1-5 years working experience, 27% had 5-10 Years' experience, 20% had 10-15 years in experience and 27% had 15 years and above under the questionnaire section. While the interview section revealed that 40% of the quantity surveyors had 10-15 years working experience and 60% had 15Years' and above experience.

**TABLE 2.0 YEAR OF EXPERIENCE**

Years of experience	Questionnaire	Interview
1-5 years	26%	
5-10 years	27%	
10-15 years	20%	40%
15 years & above	27%	60%

Table 3 shows that 19% of the quantity surveyors had 1-5 years working experience with ICT, 43% had 5-10 Years' of experience, 26% had 10-15 years in experience and 12% had 15 years and above under the questionnaire section, while the interviewed respondents' had 5- 10 years working experience with ICT, 60% had 10-15 Years' of experience and 10% had 15 years and above.

**TABLE 3.0 YEAR OF ICT EXPERIENCE**

Years of ICT experience	Questionnaire	Interview
1-5 years	19%	
5-10 years	43%	30%
10-15 years	26%	60%
15 years & above	12%	10%

## 4 RESULTS AND DISCUSSION

### QUESTIONNAIRE ANALYSIS

#### Positive impacts of ICT on Quantity Surveyors

All of the listed positive impacts were highlighted as having a strong positive effect on the performance of Quantity Surveyors. Although Speedy exchange of information was ranked first with the RII of 0.903, followed by provides an easy access to needed data (0.892), faster response to client's enquires (0.891), increase productivity through automated quantities and cost calculations (0.891) and the least was increasing project value (0.810).

**TABLE 4.0 POSITIVE IMPACTS OF ICT ON QUANTITY SURVEYORS**

S/N	Positive Impacts of ICT	RII	RANK
1	Speedy exchange of information	0.903	1
2	Provides an easy access to needed data	0.892	2
3	Faster response to client's enquires	0.891	3
4	Increase productivity through automated quantities and cost calculations	0.891	4
5	Improves job presentations	0.885	5
6	Effective collaboration and communication between project team members	0.883	6
7	Enhances innovation in work practices	0.874	7
8	Effective material procurement management	0.822	20
9	Effective decision making	0.821	21
10	Improve forecasting and control	0.814	22
11	Improving Client's satisfaction	0.813	23
12	Effective material management	0.812	24
13	Increasing project value	0.810	25

**Source:** Researcher's own field survey (2018).

### Negative effects of ICT experienced by Quantity Surveyors

Eye strain was ranked as the most prevalent negative effect experienced with the RII of 0.810. Neck pain, Watery eyes, dry eyes, blurred vision, headache, stress induced from loss of information due to virus attacks, ICT addictions, sleep disturbance, less time spent with the family, double vision, muscle weakness, wrist pains, information overloads were all ranked as negative effects often experienced with the respective RII of 0.746, 0.741, 0.740, 0.729 and 0.708. The following were indicated as negative effects experienced sometimes; burn out syndrome (0.586), occasional clumsiness (0.596), work overload (0.580), invasion of personal/ privacy time (0.576), numbness (0.553), feelings of being overwhelmed with tasks (0.551) Job distractions (0.531), making professionals redundant (0.527), weak grip (0.519), reducing professionals interpersonal skills (0.513), anxiety (0.484), tendency to drop things (0.484), feelings of job uncertainty (0.481), eroding proper communication skills (0.480), frustration (0.479) and the least ranked was dissatisfaction with job (0.437).

TABLE 5.0 NEGATIVE EFFECTS OF ICT EXPERIENCED BY QUANTITY SURVEYORS

S/N	Negative effects of ICT	RII	RANK
1	Eye strain	0.810	1
2	Neck pain	0.746	2
3	Watery eyes, dry eyes,	0.741	3
4	Blurred vision	0.740	4
5	Headache	0.729	5
6	Stress induced from loss of information due to virus attacks	0.708	6
7	ICT addictions	0.689	7
8	Sleep disturbance	0.649	8
9	Less time spent with the family	0.648	9
10	Double vision	0.647	10
11	Burning sensation	0.633	11
12	Muscle weakness	0.630	12
13	Wrist pains	0.625	13
14	Information Overload	0.610	14
15	Burn out syndrome	0.586	15
16	Occasional clumsiness	0.596	16
16	Work overload	0.580	17

17	Invasion of personal/privacy time	0.576	18
18	Numbness	0.553	19
19	Feelings of being overwhelmed with tasks	0.551	20
20	Job distractions	0.531	21
21	Making professionals redundant	0.527	22
22	Weak grip	0.519	23
23	Reducing professionals Interpersonal skills	0.513	24
24	Anxiety	0.484	25
26	Tendency to drop things	0.484	26
27	Feelings of job uncertainty	0.481	27
28	Eroding proper communication skills	0.480	28
29	Frustration	0.479	29
30	Dissatisfaction with job	0.437	30

Source: Researcher's field survey (2018).

### INTERVIEW ANALYSIS

According to all the interviewed respondents (PQS 1-10), the introduction of ICT into the construction and profession is a welcomed development, paramount to the sustenance and growth of the profession. Specifically PQS-01 iterated that ICT is a good innovation to the profession, makes the work professional, and brings out the best. PQS-06 particularly reinforced that ICT is the lifeblood of any private Quantity Surveying firm. "One of the best things that have happened to the profession" says PQS-3

### Positive benefits of ICT in the profession

All the interviewed respondents reported that ICT has increased the speed of doing works, thereby saving time and costs and making work easier. PQS-4 particularly is of opinion that ICT reduces errors, makes knowledge sharing faster. PQS-7 also opined that it reduces corruption while making work appear neat. PQS-8 stated that it gives quick analysis to trending issues in the construction industry. PQS-10 reported that it creates an easy access to contractors and consultants, while reducing paper wastages.

### Experienced negative effects of ICT in the profession

All of the interviewed respondents with the exception of PQS-7 attested to experiencing and observing negative effects of ICT. PQS-1 states body pains, job distraction, headaches, and feelings of being overwhelmed from work overloads. PQS-2 says "Our profession deals with lots of confidentiality and secrecy, the use of ICT in the



*profession has made keeping secrets difficult, even when the files are deleted, someone with the know-how can still retrieve it” this align with what PQS-6’s observation. PQS-3 complained of the younger or inexperienced quantity surveyors been prone to mistakes “Computer cannot do everything, there are some specific areas software cannot handle, younger quantity surveyors don’t know this, and are quick to believe the computer is the answer to everything” PQS-4 noted that some of these software are not user friendly, the illiteracy level is low among professionals, getting trainers to train is hard and expensive PQS-8 also stated the same problem of getting experts to train the younger quantity surveyors. PQS-5 complained of the pain of losing important files due to system break down due to virus attack, “there was a time my system didn’t work, all my files, bills of quantities were lost, till date I haven’t been able to get some back, it’s really painful” furthermore it was observed that the workload is increasing, bulky jobs are expected to be done faster while also rendering some worker jobless “What used to take 5 workers to do, is now been done by 1 person, the rest just sit and look”. PQS-9 berated the lack of training affecting the output of workers using ICT, also adding the cost implications of acquiring and train is burdensome. PQS-10 stated the problem of documents failing to open and the pain of re starting the whole work over again, also adding the security risk of hacking the documents.*

## 5 CONCLUSION

The research examined the impacts of ICT on Quantity Surveyors. The specific objectives included: to examine the impacts: positive and negative. The research concludes that speedy exchange of information, providing an easy access to needed data, faster response to clients enquires, increase productivity through automated quantities and cost calculations and improving job presentation are the major benefits of ICT to a Quantity while eye strain, neck pain, watery and dry eyes, blurred vision and headache Body pains, job distraction, headaches, and feelings of been overwhelmed from work overloads, the threat to project confidentiality, mistakes by the younger or inexperienced quantity surveyors, software not user friendly, the illiteracy level among professionals, the pain of losing important files due to system break down due to virus attack, increase in workload, bulky jobs are expected to be done faster while also rendering some worker jobless, not forgetting to add the cost implications of acquiring and train is burdensome are the negative effects experienced.

## 6 RECOMMENDATIONS

- i. Quantity surveyors are to endeavor to train themselves and learn relevant software tools related to the practice.

- ii. The younger professionals are to be vast in relevant all ICT tools and to also know all the software, particularly, more research work has to be done.
- iii. All quantity surveyors should be up to date with the new technologies.
- iv. The Cost of ICT equipment procurement should be reduced and subsidized by the company, government and the institute.
- v. Trainings and retraining should be encouraged by the professional institution and organizations.
- vi. A central backup and database should be created and maintained to ensure data are not lost due to virus attacks or system breakdown
- vii. Adequate power supply should be provided by the management and the government as most ICT tools depend on power
- viii. Organizations, firms, and government should teach ergonomics (the proper and health way to use computers) to employees in order to safe guard the health of the employees who use these tools
- ix. Original and updated softwares should be installed to ensure smooth work

## Recommendations to the QS Professional Bodies (NIQS and QSRBN)

The Nigerian Institute of Quantity surveyors (NIQS National bodies (QSRBN and NIQS) should champion the campaign for planning, regulating and implementing a world class standard educational framework including effective teaching strategies such as softwares knowledge, adequate teaching and learning facilities for outstanding performance and relevance in the construction industry and the world at large.



## REFERENCES

- Adishes, A. (2013). Musculoskeletal Disorders. Retrieved from [http://www.ilo.org/wcmsp5/groups/public/---ed\\_protect/---protrav/---safework/documents/presentation/wcms\\_232617.pdf](http://www.ilo.org/wcmsp5/groups/public/---ed_protect/---protrav/---safework/documents/presentation/wcms_232617.pdf).
- Agogo, D., & Hess, T.J. (2015). Technostress and Technology induced state anxiety: Scale development and implications. *Thirty Sixth International Conference on Information Systems: 1-11*. Fort Worth, Texas. Retrieved in: <https://agogodavid.com/wp-content/uploads/2015/06/Agogo-and-Hess-ICIS-2015-Submit-pdf>
- Ahuja, V. (2007). IT Enhanced Communication Protocols for Building Project Management by Small and Medium Enterprises in the Indian Construction Industry. A PHD thesis submitted to Queensland University of Technology.
- Akinbinu, T.R. & Mashalla, Y.J. (2014). Impact of computer technology on health: Computer Vision Syndrome (CVS). *Academic Journals*, 5(3):20-30
- Akinnagbe, F.P. & Adelakun, O.J. (2014). Assessment of Risks Associated with the Usage of Quantity Surveying Softwares in Nigeria: The Case Lagos State. *Asian Online Journal*, 1(2): 54-60.
- American Society for Surgery of the Hand. (2015). Retrieved from [https://www.assh.org/LinkClick.aspx?fileticket=7ToQme1rt\\_k%3D&portalid=1](https://www.assh.org/LinkClick.aspx?fileticket=7ToQme1rt_k%3D&portalid=1).
- Bower, J.D. (2001). ICTs, Videoconferencing and the construction industry: opportunity or threat?. *Construction Innovation 2001; 1:129-144*.
- Brewer, G. & Gajendran, T. (2009). Emerging ICT Trends in Construction Projects Teams: Delphi Survey. *ITcon*, 14.
- Brizga, D., Peks, L. & Bertaitis, I. (2013). Computer Use Impacts on Students' Health in the Context of Ecological Approach to Occupational Safety. *Engineering for Rural Development*.
- Bucher, E., Fieseler, C. & Suphan, A. (2013). The Stress Potential of Social Media in the Workplace. *Information, Communication & Society*, 16:10. 1639-1667.
- Chidebere, U.D. (2012). An Appraisal of Information and Communication Technology (ICT) Application in Nigerian Construction Industry. A project thesis submitted to Department of Civil Engineering, Faculty of Engineering, University of Nigeria, Nsukka.
- Chien, H. & Barthorpe, S. (2010). The current state of Information and Communication Technology Usage by Small and Medium Taiwanese Construction Companies. *ITcon*, 15
- Doherty, J.M. (1997). A Survey of Computer Use in the New Zealand Building and Construction Industry. *ITcon*. 2:1-13
- Ellahi, A. Khalli, M.S. & Akram, F. (2011). Computer users at Risk: Health disorders associated with prolonged Computer use. *Journal of Business Management and Economic*, 2(4): 171-182.
- Ezeokoli, F.O., Okolie, K.C., Okoye, P.U. & Belonwa, C.C. (2016). Digital Transformation in the Nigeria Construction Industry: The Professional View. *World Journal of Computer Application and Technology*, 4(3):23-30.
- Gambo M.D. (2017). Impact of Information Communication Technology on Building Construction Project Delivery in Nigeria, 2(2):10-16
- Gerardi, S. (2017). Use of Computers/Apps and the Negative Effects on Children's Intellectual Outcomes. *Sociology Mind*, 2017,7,128-132.
- Glenn, D.I. (2013). Determining Sample size. Institute of Food and Agricultural Sciences (IFAS), University of Florida, Gainesville, FL 32611, Retrieved on June 3<sup>rd</sup> 2013 from [edis.ifas.ufl.edu/pdffiles/PD/PD00600.pdf](http://edis.ifas.ufl.edu/pdffiles/PD/PD00600.pdf)
- Howard, R., Kiviniemi, A. & Samuelson, O. (1998). Surveys of IT in the Construction Industry and Experience of the IT Barometer in Scandinavia. *ITcon*. 3
- Hoq, K.M.G. (2014). Information overload: Causes, Consequences and Remedies: A study. *Philosophy and Progress* 15(16).
- Hua, G.B. 2004. IT Barometer 2003: Survey of the Singapore Construction Industry and a Comparison of Results. *ITcon*, 10;1-13.
- Ikediashi, D.I. & Ogwueleka, A.C. (2016). Assessing the use of ICT systems and their impact on construction project performance in the Nigerian construction industry. *Vol. 14, 2(252-276)*.
- Isikdag, U., Underwood, J., Kuruoglu, M., Goulding, J. & Acikalin, U. (2009). Construction Informatics in Turkey: Strategic Role of ICT and Future Research Directions. *ITcon*, 14
- Kareem, H.I.A. & Bakar, A.H.A. (2011). Identifying IT benefits for Malaysian Construction Companies. *ITcon*. 16
- Lee, C.C. & Egbu, O.C. (2007). Information Technology Tools for Capturing and Communicating Learning and Experiences in Construction SMEs in Developed and Developing Countries. *ITcon* 12
- Michaloski, A.O. & Paula, A. (2010). A survey of IT Use by Small and Medium-Sized Construction Companies in a City in Brazil. *ITcon*. 15
- Monideepa, T., Tu, Q., Bhanu, S. Nathan, R. & Ragu-Nathan, T.S. (2007). The Impact of Technostress on Role Stress and Productivity. *Journal of Management Information Systems*. 24:(1).301-328.
- National Bureau of Statistics (NBS). (2017). Nigerian Gross Domestic Product Report. Fourth Quarter. 12: Quarter Four. Available from [www.nigeranstat.gov.ng](http://www.nigeranstat.gov.ng).
- Oyediran, O.S & Odusami, K.T. (2005). A study of Computer Usage by Nigerian Quantity Surveyors. *Journal of Information Technology in Construction*. 10: 303.
- Paul, H.J. (2011). The impact of digital technologies on human wellbeing: Evidence from the science of mind and brain.
- Peansupap, V. & Walker, D.H.T. (2004). Strategic adoption of information and communication technology (ICT): Case studies of construction contractors. In: Khosrowshahi, F. (Ed.), *20<sup>th</sup> Annual ARCOM Conference*, 2: 1235-1245.
- Peansupap, V. & Walker, D.H.T. (2005). Factors Enabling Information and Communication Technology Diffusion and Actual implementation in Construction Organizations. *ITcon* 10: 193 – 218



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- Rimmington, A., Dickens, G. & Pasquire, C. (2015). Impacts of Communication Technology (ICT) on Construction projects. *Organization, Technology and Management in Construction. An international Journal*.
- Rivard, H., Froese, T., Wough, L.M., El-Diraby, T., Mora, R., Torres, H., Gill, S.M., & O'Reilly, T. (2004). Case studies on the Use of Information Technology in the Canadian Construction Industry. *Journal of Information Technology in Construction*, 9: 19-34.
- Samuelson, O. (2008). The IT- Barometer- A decade's Development of IT use in the Swedish Construction Sector. *ITcon*, 1:1-19
- Tagurum, Y.O., Okonoda, K.M., Miner, C.A., Bello, D.A. & Tagurum, D.J. (2017). Effect of technostress on job performance and coping strategies among academic staff of a tertiary institution in north-central Nigeria. *International Journal of Biomedical Research*, 8(6): 312-319.
- Thomee, S. (2012). ICT use and Mental Health in Young Adults. Effects of Computer and Mobile Phone use on stress disturbances, and symptoms of depression.