

Influence of Information and Communication Technologies on Organizational Decision Making: Centralization or Decentralization

**Aliyu Alhaji Abubakar¹, Daudu Bala Abubakar²
and Hussainat Taiwo Idiara³.**

¹Department of Business Administration,
Faculty of Management Science
Gombe State University.

^{2&3}Department of Business Administration,
College of Business and Management Studies
Kaduna Polytechnic
Email: - twowayss@yahoo.com

pp 64-68

ABSTRACT

Most articles in the field of management evidence that Information and Communication Technologies enhances Organizational Decision Making. Despite of the amount of studies a systematization of dimensions on Information and Communication Technologies and its effects on firms Centralization or Decentralization is still absent. The purpose of this paper is to fill this literature gap. This study aimed to provide a framework for classifying Information and Communication Technologies and its effects on Organizational Decision Making. The paper provides a conceptual paper on the role of Information and Communication Technologies for Centralization or Decentralization. Similarly, this study also provides a perspective on Information and Communication Technologies for Centralization or Decentralization as a topic of great interest for managers, practitioners and policy-makers. status, perceived organizational support, and employee performance.

1.0 Introduction

The Influence of Information and Communication Technologies (ICT) on the decision making structure of the twenty first century has been a topic of debate for decades (Shachaf, 2008; Ali, & Kumar, 2011). Some scholars were on the view that, ICT increases the information available to top management (Bloom et al., 2014; Talke et al., 2011), and the coordination advantages that it provides may lead organizations to centralize decision making. While others, view it as a means to disseminate global information of the organizations to line workers enabling them to make better decisions as well as enhances management's monitoring capability, favoring decentralization.

In the past decade, due to the swift technological progress of Information and Communication Technology (ICT) coupled with its rapidly declining prices, ICT has diffused broadly into many sectors of the economy. Several empirical studies report that ICT has a positive impact on productivity of organizational performance on decision making (Bayo-Moriones et al., 2013; Lee, et al., 2011). For example, industries in Malaysia recognised that ICT has contributed greatly toward effective decision making (Mai, 2015; Phang & Foong, 2010).

However, in order to fully reap the benefits of ICT, several studies have stressed the importance of complementary workplace reorganization accompanying the adoption of ICT. Cardona et al., (2013), point out that a key value of ICT is its ability to enable complementary organizational investments such as business processes and work practices, which in turn increases productivity. Arvanitis et al., (2013), find empirical evidence of complementarities between ICT and workplace organization, and report that the type of workplace organization complementary with ICT is one with a decentralized decision making structure. Several case studies similarly report changes in work practices accompanying ICT deployment.

Several empirical studies have investigated the joint effects of both workplace reorganization and ICT on productivity. Buabeng-Andoh, (2012), examine the effects of different types of work practices, ICT, and educational level of employees on labor productivity, and find that workplace practices positively affects productivity. Dahl et al., 2011; Cardona et al., 2013a and Cardona et al., 2013b, report that organizations that combine ICT, workplace reorganization, and more skilled workers increases productivity. Arvanitis et al., (2013), examine the effects of complementarities between the various inputs including ICT and workplace reorganization, and find that enhancement of group work and flattening of hierarchies' increases labor productivity.

Although past studies provide some support for decentralizing decision rights accompanying ICT

investment, there is still a lack of quantitative studies compared with the plethora of case studies accentuating the importance of decentralizing decision rights to reap the benefits of ICT. Moreover, since there is little quantitative evidence on the effects of centralization on IT performance, the productivity effects of centralization are unclear.

This study intends to fill this gap by providing quantitative evidence on the effects of reallocating decision rights on ICT performance. Unlike past studies that have focused on the effects of "workplace reorganization", the research aim is to examine the productivity effects of IT due to changing decision rights. Thus, the study will not address issues such as the restructuring of organizational form (e.g. flattening of hierarchies), and instead focus on the change in decision rights, given an organizational structure (which is typically some form of hierarchy).

An important point to note is that this study will only focus on Industries revolving around Johor, Malaysia. The decision making structure of a typical Asian organizations and European organizations are different (Archer, 2014), so implications from past studies may not directly apply to Asian organizations, and the results of this study can also be applied to organizations outside Asia.

Since the decision making structure of Asia organizations has been more decentralized than European organizations, it is interesting to find whether the acclaimed effects of decentralization from past studies also has a positive productivity effect in Asia. Furthermore, since the decision making structure had been more decentralized, it may be the case in Asia that centralization is the solution to reap the benefits of ICT.

2.0 The Relationship between ICT and Decision Making

The debate about whether ICT would lead to centralization or decentralization of decision making stems back when predicted, that the introduction of ICT in organizations would lead to centralization of decision making (Bloom et al., 2014). Today, many studies have attempted to address this issue, some pointing out to centralization, some indicating decentralization, while others reporting no effects at all.

Garicano & Wu, (2012), stressed the importance of locating knowledge and decision rights together to improve organizational performance. Laudon & Laudon, (2013), proposed two ways to collocate information and decision making, which have been referred to as the MIS solution and the organizational design solution.

The MIS solution transfers the information required to the decision maker using IT, whereas the organizational design solution moves decision rights to where the pertinent information is. The MIS solution is usually associated with centralization

whereas the organizational design solution usually favors some form of decentralization (Laudon & Laudon, 2016).

Bof & Previtali, (2010), presents a framework that explains why ICT may lead to either centralization or decentralization of decision rights depending on the way ICT impacts decision related costs that the organizations face. While, Demirkan & Delen, (2013), stated that ICT provides the capability to improve the quality and speed of top management's decision making which has an effect of decreasing decision information costs, leading to centralization of decision rights. On the other hand, ICT improves the monitoring capability of top management which reduces agency costs, leading to decentralization. Thus, the choice of centralization or decentralization depends on the specific cost structure of the organizations.

2.1 ICT and Centralization

A key reason that ICT may lead to centralization is the coordination advantages that ICT provides by increasing the processing capacities of managers or decreasing communication costs which equips managers with more information. Bayo-Moriones et al., (2013), stresses the improved information processing capability by managers, which ensues in centralization and presents a model which reveals that the reduction in communication costs caused by ICT would lead to centralization due to the increased span of control by top management. Similarly, Nooraie (2012), point out that ICT improves the quality and speed of top management's decision making process, which may lead to centralization.

Several anecdotal evidences report that many Asian organizations have used ICT to centralize decision rights. For example, Aeon, a large retail chain in Japan, introduced a real-time online system that enables the central office to access sales data and control the inventory. After the implementation of the new system, the head office now sets the minimum/maximum inventory and the ordering amount, which was previously decided by the person in charge at the local store. The case of Aeon clearly depicts how ICT has engendered an opportunity to centralize decision rights by providing top management pertinent information for decision making (Matsunaga, 2012; Wrigley & Lowe, 2010; Gondor & Morimoto, 2011; Tang et al., 2016).

The case of All Nippon Airlines (ANA) reveals the coordination advantages provided by ICT. After the introduction of a new information system at ANA, the seat allocations which were delegated to each shop are now handled on a first come first serve basis, based on the slot optimized by the new system. This reduced the decision rights and degree of freedom of the sales division (O'Connell & Bueno, 2016; Neudert, 2012).

2.2 ICT and Decentralization

Various studies have indicated why it is advantageous for organizations to decentralize decision rights with the advent of ICT. Alleviation of information overload, increased sharing of global information at the floor level, and reduction in agency costs are some reasons that have been indicated in past studies that supports decentralization of decision rights accompanying the deployment of ICT.

First, as ICT gets deployed in an organization, the amount of available information increases abruptly, leading to a phenomenon of information overload. Decentralizing decision rights alleviates the burden on top management as well as cut unnecessary communication up and down the hierarchy. Andrade & Joia, (2012), stated that ICT speeds up the organization's strategic environment, other things being equal, this would lead to smaller and decentralized organizations.

Second, ICT has made it possible to disseminate and access information easily at the floor level, and as a consequence, employees can now make decisions using global information of the organizations as well as their own specific idiosyncratic knowledge that they possess on the floor. Andrade & Joia, (2012) models various coordination structures of a organizations competing in multiple horizontal markets and shows that expected profits are generally the highest for organizations with a decentralized decision making structure with access to global information. Similarly, Wong et al., (2011) and Andrade & Joia, (2012) provides a framework that explains how the introduction of ICT affects decision making of different divisions by enabling access to global information of the organizations together with their division specific knowledge.

Third, ICT may lead to decentralization is due to a reduction in agency costs. () point out that the enhanced monitoring capability provided by ICT may lead organizations to decentralize decision rights (Zoghi et al., 2010; Garicano & Wu, 2012).

3.0 Research Questions:

Base on the above findings, the following research questions were able to be postulated:

1. What is the effect of centralizing/decentralising of information and communication technologies on Asian organizational decision making?

4.0 The objectives of the research:

The overall objective of this study is to investigate whether centralizing/decentralising of information and communication technologies has any influence on organizational decision making. Specifically, the objective of this study is to:

To ascertain whether centralizing/decentralising of information and communication technologies has any positive influence on organizational decision making.

To provide a quantitative evidence on the effects of reallocating decision rights on ICT performance.

5.0 Data and Methodology

Hence, in order to understand the economy wide effects of centralization and decentralization of decision rights on the productivity effect of ICT, this research intended to conduct a study to examine the change in the effects of ICT performance in organizations that changed its decision making structure, using Statistical Package for the Social Sciences (SPSS) to ascertain some descriptive statistics of the whole sample regarding change in the decision making structure of organizations and to run Multiple regression to determine the relations between the identify variables.

The data related to organizations performance will be obtain from the respective organizations that are willing to participate in the survey. The survey will cover all organizations in manufacturing, wholesale and retail sector, and some business service sectors with more than 50 employees and above. The data relevant to the present study are the amount of tangible fixed capital, number of employees, amount of ICT expenditure, and value-added which was calculated using double deflation, subtracting input from output (sales).

The survey questionnaire will include on organizational change, such as whether the organizations conducted a specific type of organizational change or business process reform during the period under study. The types of change or reform survey will also include flattening of hierarchy, reorganization of divisions, change in trade share, and increased outsourcing. The respondents will be asked to circle their choice of preference.

The results will indicate whether centralization (or centralization and decentralization) have a substantial productivity effect on ICT for Organizations that changed its decision making structure and the productivity effects are more marked for Organizations that conducted radical change of decision rights. Essentially, the finding will support or reject the effects of the change in decision rights accompanying ICT investment by the respondents in our sample. Thus, the responses may be interpreted as the perceived effects of changing decision rights by the organizations.

6.0 Conclusion

The importance of ICT can't be over emphasized on how it plays a key role in business innovation in various organizations. Therefore, effectiveness in ICT use in these sectors may have clearer effect on productivity performance, as compared to other organizations that are far lag behind.

This study aims to examine the impact of centralization and decentralization of decision rights on the productivity effects of ICT. Using SPSS Asian organizations, the increase in the partial elasticity of ICT due to changes in decision rights will be estimated, and the results will indicate whether centralization or both (centralization and decentralization) of decision substantially increases the productivity effects of ICT. Moreover, the finding will also highlight whether large gain in productivity are realized by organizations that went through a radical change in decision rights.

The sample grouped will be enough to give/predict evidence that the productivity effects of ICT due to reallocating decision rights is large enough for large organizations compared with SME's. The disparity in the ICT coefficients between large and small organizations may reflect the substantial advantages that large organizations have gained by increased coordination or enhanced decision making of workers. In addition, the sample will also report whether productivity effects of ICT due to reallocation of decision rights in the manufacturing sector, are realized by organizations that performed decentralization in the wholesale/retail sector and organizations that conducted centralization or decentralization in their organizations.

7.0 Reference

- Ali, J., & Kumar, S. (2011). Information and communication technologies (ICTs) and farmers' decision-making across the agricultural supply chain. *International Journal of Information Management*, 31(2), 149-159.
- Andrade, A., & Joia, L. A. (2012). Organizational structure and ICT strategies in the Brazilian Judiciary System. *Government Information Quarterly*, 29, S32-S42.
- Archer, C. (2014). *International organizations*. Routledge.
- Arvanitis, S., Loukis, E. N., & Diamantopoulou, V. (2013). Are ICT, workplace organization and human capital relevant for innovation? A comparative study based on Swiss and Greek micro data.
- Bayo-Moriones, A., Billón, M., & Lera-López, F. (2013). Perceived performance effects of ICT in manufacturing SMEs. *Industrial Management & Data Systems*, 113(1), 117-135.
- Bloom, N., Garicano, L., Sadun, R., & Van Reenen, J. (2014). The distinct effects of information technology and communication technology on firm organization. *Management Science*, 60(12), 2859-2885.
- Bof, F., & Previtali, P. (2010). National models of public (e)-procurement in Europe. *Journal of e-Government Studies and Best Practices*, 2010(315295), 1-14.

- Borghoff, T. (2011). The Role of ICT in the Globalization of Firms. *Journal of Modern Accounting and Auditing*, 7(10), 1128.
- Buabeng-Andoh, C. (2012). Factors influencing teachers' adoption and integration of information and communication technology into teaching: A review of the literature. *International Journal of Education and Development using Information and Communication Technology*, 8(1), 136.
- Cardona, M., Kretschmer, T., & Strobel, T. (2013). ICT and productivity: conclusions from the empirical literature. *Information Economics and Policy*, 25(3), 109-125.
- Cardona, M., Kretschmer, T., & Strobel, T. (2013). ICT and productivity: conclusions from the empirical literature. *Information Economics and Policy*, 25(3), 109-125.
- Dahl, C. M., Kongsted, H. C., & Sørensen, A. (2011). ICT and productivity growth in the 1990s: panel data evidence on Europe. *Empirical Economics*, 40(1), 141-164.
- Demirkan, H., & Delen, D. (2013). Leveraging the capabilities of service-oriented decision support systems: Putting analytics and big data in cloud. *Decision Support Systems*, 55(1), 412-421.
- Garicano, L., & Wu, Y. (2012). Knowledge, communication, and organizational capabilities. *Organization science*, 23(5), 1382-1397.
- Gondor, D., & Morimoto, H. (2011). Role of World Wildlife Fund (WWF) and Marine Stewardship Council (MSC) in seafood eco-labelling policy in Japan. *Sustainability Accounting, Management and Policy Journal*, 2(2), 214-230.
- Lee, Y. C., Chu, P. Y., & Tseng, H. L. (2011). Corporate performance of ICT-enabled business process re-engineering. *Industrial Management & Data Systems*, 111(5), 735-754.
- Laudon, K. C., & Laudon, J. P. (2013). *Management Information Systems* 13e.
- Laudon, K. C., & Laudon, J. P. (2016). *Management information system*. Pearson Education India.
- Mai, M. Y. (2015). Science Teachers' Attitudes towards Using ICT and Mobile Learning Technologies in Malaysian Schools. *EJIS European Journal of Interdisciplinary Studies Articles*, 3.
- Matsunaga, L. (2012). *The changing face of Japanese retail: Working in a chain store*. Routledge.
- Neudert, P. (2012). *Distributed Innovation in Innovation Networks and its limits. The Case of Boeing's 787 Dreamliner*.
- Nooraie, M. (2012). Factors influencing strategic decision-making processes. *International Journal of Academic Research in Business and Social Sciences*, 2(7), 405.
- O'Connell, J. F., & Bueno, O. E. (2016). A study into the hub performance Emirates, Etihad Airways and Qatar Airways and their competitive position against the major European hubbing airlines. *Journal of Air Transport Management*.
- Phang, M. M., & Foong, S. Y. (2010). Information communication technologies (ICTs) and knowledge sharing: The case of professional accountants in Malaysia. *World Journal of Science, Technology and Sustainable Development*, 7(1), 21-35.
- Talke, K., Salomo, S., & Kock, A. (2011). Top management team diversity and strategic innovation orientation: The relationship and consequences for innovativeness and performance. *Journal of Product Innovation Management*, 28(6), 819-832.
- Tang, A. K., Lai, K. H., & Cheng, T. C. E. (2016). A multi-research-method approach to studying environmental sustainability in retail operations. *International Journal of Production Economics*, 171, 394-404.
- Shachaf, P. (2008). Cultural diversity and information and communication technology impacts on global virtual teams: An exploratory study. *Information & Management*, 45(2), 131-142.
- Wong, E. M., Ormiston, M. E., & Tetlock, P. E. (2011). The effects of top management team integrative complexity and decentralized decision making on corporate social performance. *Academy of Management Journal*, 54(6), 1207-1228.
- Wrigley, N., & Lowe, M. (2010). The globalization of trade in retail services. *Organisation for Economic Co-operation and Development*.
- Zoghi, C., Mohr, R. D., & Meyer, P. B. (2010). Workplace organization and innovation. *Canadian Journal of Economics/Revue canadienne d'économique*, 43(2), 622-639.