



Research Article

A Literature Survey on ICTD Research by IS Community

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A B S T R A C T

Despite a huge number of Information and Communications Technology for Development (ICTD) research so far, little is known about the landscape of published articles in Information Systems (IS) literature. This paper systematically reviews extant ICTD research published in the IS field from 1980-2016. The author systematically analyzed 192 articles published in A* and A-rank IS journals and explored which theoretical lenses, contexts, units of analysis, types of technology, and research methods dominate extant research in the field. As such, this present work provides a unique snapshot of the current research landscape that can help future ICTD field progress.

1. INTRODUCTION

As a mature and interdisciplinary field, ICTD has invited participation from numerous disciplines for several decades such as development studies, medicine, environmental engineering, computer science, social science, decision science, etc. Motivated by the constellation of theories circling around ICTD by Heeks [1] and Wowak et al. [2], in which informatics and development studies are two essential fields building ICTD studies, the author believes that IS represents a bridging discipline between these fields.

Most of the ICTD literature reviews typically examined specialized journals as their main source pool, notably Information Technology for Development (ITD), Information Technologies and International Development (ITID), and Electronic Journal of Information Systems in Developing Countries (IJISDC). For example, Gomez [3] conducted a bibliometric study (including the level of examination, research paradigm, method, and demography) of ICTD research published in specialized ICTD journals and conferences. Several other

reviews generally concentrated on examining specific topic such as ICT Barriers and Success Factors [4], ICTD project outcomes [5], healthcare informatics [6], [7], e-government adoption and implementation [8], [9], Human Computer Interaction [10], and even gender issue [11]. In addition, previous reviews also have an issue with methodological limitation, which is generally found in expert review articles [12]–[14]. While some articles have already used IS journals, [15]–[17], these studies limited their source pool into only subjectively popular IS journals (9, 11, and 8 journals respectively).

The issue of publishing ICTD research in top journals has been debated in years. The authors argue that this is difficult in nature, forcing them to publish in unranked journals or develop their own journals [18]. In her review, Naudé [18] shows that most of the specialized ICTD journals are not listed in a notable citation database, or with low rank. She argues that the low novelty of theory, low impact, and low acceptance from the original player (e.g. African researcher), are main problems of why ICTD is difficult to reach top journals. In this case, even when ICTD researchers have tried to address theoretical implications, the universality of what emerged from contextuality are frequently questioned by the reviewers in top IS publication [19], mainly due

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to the impossibility of replication of the practices [20]. While various arguments arose in publishing ICTD studies, one central questions might help in this case; what sort of research that successfully published in top IS journals.

This study aims to review ICTD studies published in top IS journals and summarize the theories, context, topic, and research design, then identify research trend and gaps based on the findings. The author combined literature review methodology suggested by Vom Brocke et al. [21] and Webster & Watson [22] which consists of three stages; defining goal and scope of review, literature search-filter-analysis, and synthesizing the results. By using systematic literature review, the author aims to maximize the extensive coverage of the field and repeatability of the searching-filtering process. While the quality of reviews arguably is not dependent on the method, the well-documented and structured approach in the searching process enable the readers to assess the validity of the reviews [21]. This aspect of the review process is crucial since ICTD is an interdisciplinary field with no clear cross-sections boundary and where the foundation exactly placed [18]. Moreover, conducting a literature review on a mature field provides an accumulative understanding of the body of research as well as substantive direction on extending the field [22]. In the next section, the author describes the research method and data sample before present the analysis of the dataset. Finally, this article concludes with suggestions for future research.

2. METHODS

2.1 Search strategy

A* and A-ranked IS journals based on Excellence in Research for Australia (ERA) & Australian Business Deans Council (ABDC) ranking were reviewed, which comprises a total of 71 journals. All versions of journal ISSN number were used when searching all articles using citation database Scopus. As for search terms, the author combined various nomenclature of ICTD in the literature (see fig.1). In order to prevent result bias, 'development' was not included as this term is interchangeable with another different topic within IS, mainly software development. Finally, the forward-backward technique was not needed since the author had determined the source pool from the beginning.

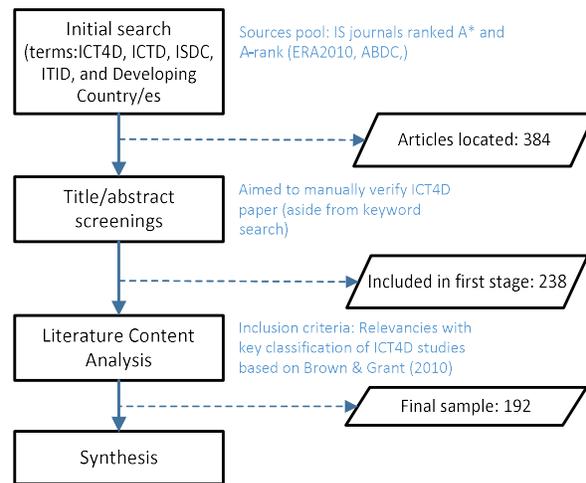


Figure 1 Literature Review Methodology

2.2 Sample selection and data analysis

The search process was conducted at the end of 2016. In the beginning, 384 articles were found. First verification was conducted by scanning the title, abstract, and keyword. When necessary, full-text reading was undertaken in this first stage. A total of 146 articles were removed in first selection due to irrelevancies with ICTD topic or different focus of the paper. In the next stage, content analysis was conducted to determine the suitability of the articles. ICTD research classification by Brown & Grant [17] was used as the foundation of inclusion/exclusion justification of the articles. During this step, 46 articles were removed.

As a final sample, 192 articles are analysed in this study, of which 171 are research articles, 4 are editorial, 1 research note, and 16 review articles. The author intentionally did not use the document type as exclusion criteria, but purely on the relevancies of the content. This step also validates the categorization of document type of Scopus system, as the author found several review article which share similar identities with research articles such as articles by Jaruwachirathanakul & Fink [23], Boateng et al. [24], Wresch & Fraser [25], Tan & Ludwig [26], or article-in-press by Rana et al. [27], de Brito et al. [28]. Next, the author identifies seven key points in final samples; theoretical lens, research approach, research method, context/sector of examination, research topic or unit of analysis, the level of analysis, and the technology discussed in the articles.

The dataset (fig.2) comprises 192 articles from 34 journals. Most articles based on the journals appearance in the dataset are International Journal of Information Management (22 articles), Journal of Global Information Management (22 articles), International Journal of Medical Informatics (16 articles), Information Technology and People (16 articles), MIS Quarterly (11 articles), Communication of the ACM (11 articles), Information and Management, and Journal of Information Technology (9 respectively). The dataset comprises a total of 498 authors.

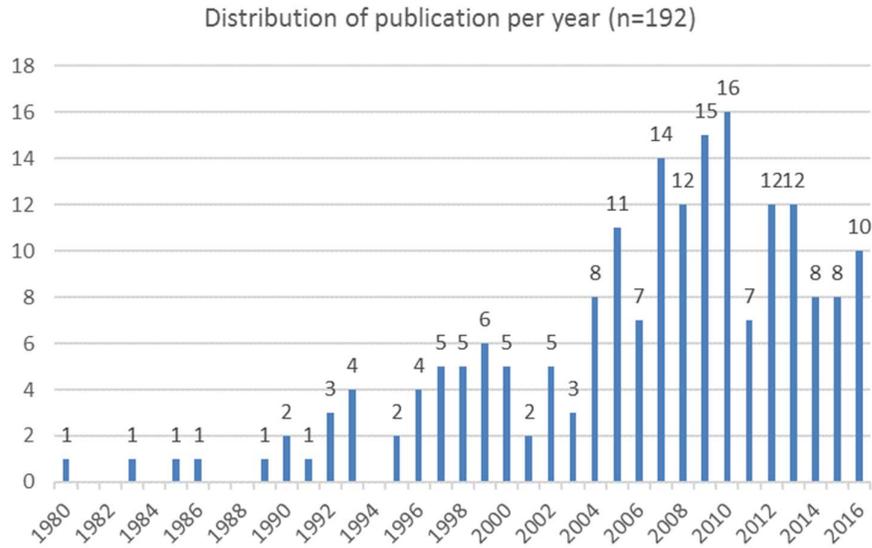


Figure 2 Distribution of articles analyzed in this review

3. FINDINGS

3.1 Theories informing ICTD research

Avgerou [13], [14] proposes two perspectives of ICTD research to understand the different purpose of theories in this field. First is the technology-transfer or top-down approach, which classify every research and practices where project initiators such as government, NGOs, and vendors try to diffuse new technology to certain groups / communities. As such, Diffusion of Innovation (DOI) and Technology Acceptance Model (TAM) are prominent theories in technology-transfer discourse [13, p. 135], [14, p. 3]. The second discourse is socially embeddedness, or bottom-up approach, where researchers prioritize their understanding of the

social configuration first prior suggesting the innovation. Most of the studies categorized in this discourse use theories from social science discipline to guide context-specific action, such as complexity theory, Actor Network Theory (ANT), and institutional theory [13, p. 135], [14, p. 4].

The author identifies 66 articles that use theories to guide their ICTD research. As shown in fig.3, the result indicates that technology-transfer theories were the most popular of ICTD research in the time period. The rest of the papers either developed their own framework or used previously published models, such as Perceived eReadiness Model [26], [29], or Human-Organization-Technology fit model [30]. In most cases, the authors use broad perspective from development studies or digital divide as the background of ICTD studies [24], [31]–[33].

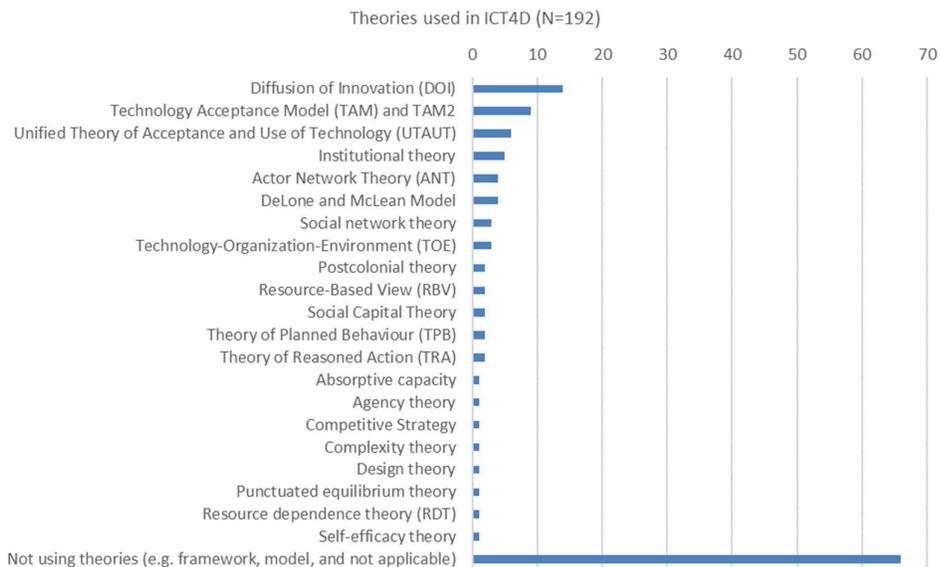


Figure 3 Distribution of theories used in dataset

3.2 Research methods used in ICTD research

The qualitative approach, including qualitative case study, ethnography, critical research, and action research, appears to be the most popular approach in the dataset, followed by quantitative studies. The author group the general reviews, theoretical framework papers, research notes, and editorial articles as a conceptual approach, which is third placed. In addition, as suggested by Gomez [3], mixed methods research has invited some interests to ICTD researchers and would be growing in the future [34]–[38]. Fig. 4 illustrates the research approach analyzed in the dataset.

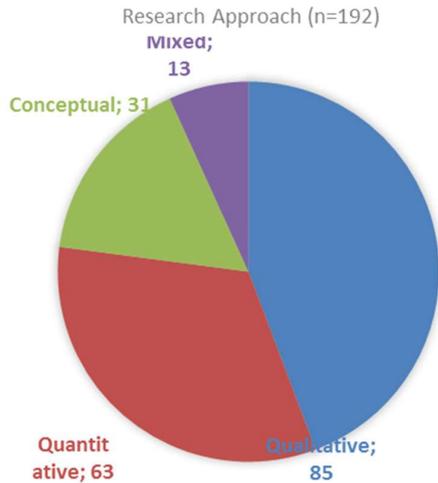


Figure 4 Research Approach

In research methods (fig. 5), the result indicates that in IS publication, the descriptive contents (e.g. describing experiences, project evaluations, best practices) are popular as same as the articles published in specialized ICTD journals [3, p. 8]. The finding also recalls Walsham & Sahay [39] suggestions about the lack of action research and ethnography studies in this field. Finally, the author identifies the document analysis as a distinct research method [40] to distinguish them with data collection approach frequently used in research method (e.g. questionnaire, interview, focus group).

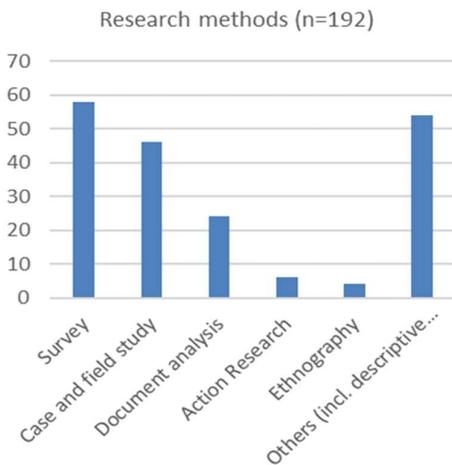


Figure 5 Research Method

3.3 Units of analysis and contexts in ICTD research

The overall finding shows no surprise that country-level and organization-level are the most popular focuses of studies, followed by an individual (e.g. user acceptance and behavior) and community level. However, the findings suggest that organizational-level is favored the most, whereas the previous reviews generally suggested the popularity of country-level see [3, p. 12], [41, p. 352]. The different sources between top IS journals and specialized ICTD publication might become the main reason for this discrepancy. Nevertheless, the better explanation is that in this study, the author defines the level of analysis as the object of studies and then where the primary contribution of the findings take place. It implies that even in the title, authors explicitly mention “lesson from certain country”, the justification is still based on the aims of the study described in the content. For example, the author classifies the article by Uzoka & Ndzingo [42] as organizational-level study since in that particular paper, they examined the organizational structure (managerial position) and their impact on ICT innovation, regardless the country mentioned in the title or the potential of generalizability of the findings to the country-level. Multilevel of analysis, on the other hand, which examines the interaction between levels to understand the holistic perspective of ICT implementation (e.g. examine macro-sociopolitical factor affecting local context adaptation of ICT) [14] seems to be lacking in number e.g., [43], [44].

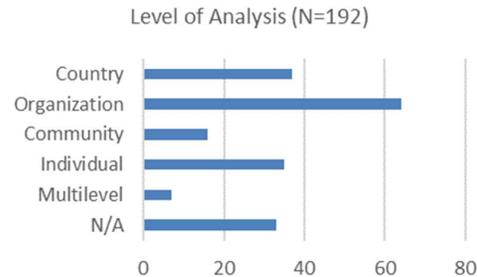


Figure 6 Unit of Analysis

On the other hand, healthcare sector appears to be the most favorable contexts, in addition to the other three (business, government, and social) mentioned in the previous reviews [3], [45]. The finding suggests a need for more research in other sectors, such as tourism and agriculture. Related articles such as a study by Adam & Urquhart [46] who evaluated IT capacity building for tourism organization in Maldives and emphasized the role of computer and internet in enabling knowledge transfer. Another example is the study by Dey et al. [47] who evaluated Bangladesh’s farmer’s eagerness to use a mobile phone for their benefits but inhibited by language barriers of using English that pre-installed in the devices.



Figure 7 Research Contexts

3.4 Research topics in ICTD research

Relatively similar to another review on non-IS literature e.g. , [41], the author found that in IS journals, ICT adoption and ICT use/implementation are the major topics in ICTD research. ICT Impact, on the other hand, is more popular in IS publication compared other sources see [41, p. 351]. The rest of the articles discuss other topics such as ICT design (systems and software development), IS management, and specific issue on ICT infrastructure in developing countries (see fig. 8).

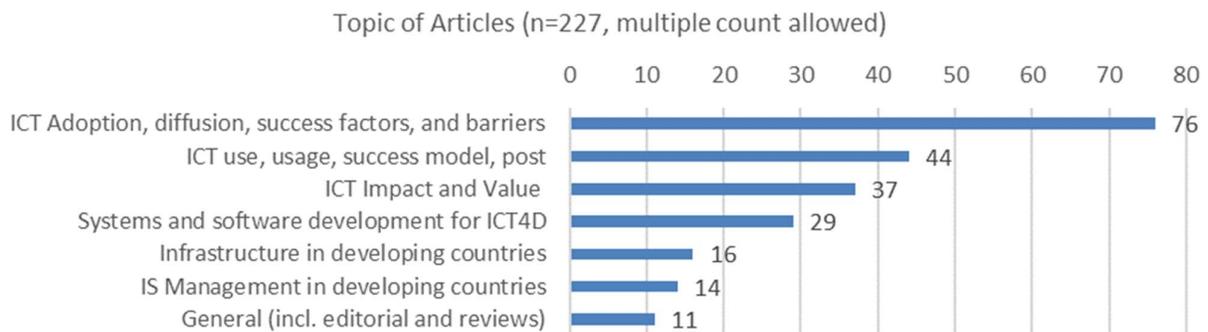


Figure 8 Research topic

Concurred with what Gomez [3] found in the specialized ICTD journals, general classification of ICT also dominates the publication during the time period. However, the distribution of the number, as illustrated in Table 1 below, shows more variety of technology examined in ICTD studies. Following Walsham & Sahay [16] suggestion ten years ago, this field requires more in-

depth studies on particular technologies examining the way they are used and adopted in the society [16, pp. 17–18]. This result also suggests that the main issue of ICT in developing countries is no longer the availability of infrastructure, but the pervasiveness of ICT in a variety of life aspects.

Table 1 Technology in ICTD

Technology/ICT	Count (n=192)
General classification of ICT (incl. computer, PC, microcomputer, telephone, telecommunication infrastructure)	24
Health information systems (incl. telemedicine, clinical system, mhealth)	22
Internet, internet kiosk, telecentre, wireless, WLAN	17
Enterprise IT (EDC, EIS, DSS, ERP) and e-business (e-proc)	16
E-government	15
E-commerce	14
Internet and mobile banking	11
Mobile technology	6
Electronic Medical Record, EHR	6
Geographical information systems (GIS)	5
Cloud computing	2
Social network	2
Miscellaneous (e.g. biometric, eTourism, e-learning)	8
N/A	44

4. CONCLUSION And FUTURE RESEARCH

This study demonstrates the distinction of ICTD research published in IS publication compared to other sources, especially specialized ICTD publication. Some aspects show similar patterns, such as research approach, research method, research sector, and examined technology. However, ICTD research published in IS publication tend to use explicit theories to guide or explain their research. In his review, Roztocki & Weistroffer [41], who used more variety of literature, found only 8 articles out of 173 total samples ($\pm 4,6\%$) that use theories in their studies, which is significantly small compared to the finding in this study ($\pm 34\%$). Furthermore, this study also suggests the popularity of healthcare sector in IS publication and ICT Impact / Value as the general topic of examination.

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Nevertheless, this study might have several limitations. Since the author used online citation database as a primary tool for searching, there might be possibilities where relevant articles are missed due to incomplete data on abstract, keywords, stored in the citation database. In addition, the author employed both deductive and inductive approach in categorizing and coding the articles, which might constitute the subjectivity of the analysis.

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