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Barriers and Facilitators of ICT Adoption in Social Science Research: Insights from Saudi Arabian Context

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Abstract

The objective of this research is to elucidate the determinants that affect the implementation of information and communication technology tools and their effects on scholarly productivity. The study employed both descriptive and inferential statistical methods to analyze the data obtained from social science researchers in Saudi Arabia. The findings underscore various impediments to the adoption of information and communication technology (ICT), such as the intricate nature of the technology, insufficient technical expertise, and apprehensions regarding the security of data. Furthermore, it was discovered that information and communication technology (ICT) tools that are easy to use, training and support programs, as well as organizational support, have proven advantageous. The results of the correlation study indicate a moderate yet significant association between the adoption of ICT and research output. Research has demonstrated that the adoption of ICT is significantly influenced by both age and gender. Empirical data suggests that female researchers exhibit a greater inclination towards open adoption patterns, while younger researchers display a higher propensity for the adoption of information and communication technology. The study's results offer empirical evidence and practical applications concerning the integration of information and communication technology in social science research. The findings underscore the necessity of removing obstacles through the creation of easily reachable resources and all-encompassing educational initiatives. The adoption of ICT is greatly facilitated with the support of an organization.

Keywords: ICT adoption, social science research, barriers, facilitators, research productivity, Saudi Arabia.

Introduction

Similar to various other sectors, the proliferation of ICT has brought about a transformation in the research methodologies and protocols (Khan & Lee 2019). The integration of Information and Communication

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Technology (ICT) in the field of social sciences presents novel opportunities for data acquisition, examination, and dissemination, ultimately culminating in improved outcomes of research endeavors (Mehra et al., 2005; Vosloo et al., 2005). The significance of Information and Communication Technology (ICT) in research is increasingly evident; however, there exist significant impediments that hinder its widespread adoption (Kim et al., 2021; Teixeira et al., 2021). In order to ensure the successful integration of ICT in social science research, it is imperative to initially identify and subsequently mitigate any contextual barriers that may arise, as suggested by LaPelle et al. (2018); Olaniyi & Oyedele (2019).

The objective of this study is to investigate the facilitators and barriers to the utilization of information and communication technologies in social science research, specifically in the distinctive context of Saudi Arabia. A comprehensive exploration of the challenges and opportunities inherent in the use of ICT in social science research can yield valuable insights for academics, policymakers, and institutions seeking to enhance their utilization of this technology.

The utilization of digital tools and platforms in contemporary research has enabled researchers to facilitate data collection, analysis, and dissemination through the use of Information and Communication Technology (ICT) (Dahiya et al., 2020; Nambisan, 2017). Various forms of technology such as software programs, online surveys, data visualization software, and collaboration platforms can be cited as examples. The utilization of ICT in social science research has the potential to enhance data collection, data quality, cross-disciplinary collaboration, and research output, as suggested by Hwang et al. (2020) and Semaan (2019).

Saudi Arabia has made significant strides in integrating information and communication technology (ICT) in various sectors as a developing country. The government's emphasis on and financial commitment to digital transformation have resulted in an increase in digital literacy, as well as the usage of the internet and smartphones (Alhazmi et al., 2018). Notwithstanding the potential benefits, the utilization of information and communication technologies (ICT) in social science research is still in its nascent stage and encounters distinctive challenges within the Saudi Arabian context.

There exist multiple compelling justifications for delving deeper into the prospects and obstacles entailed in utilizing Information and Communication Technologies (ICTs) within the realm of social science research in Saudi Arabia. The study contributes to the existing body of literature by enhancing our comprehension of the function of information and communication technologies (ICTs) in scholarly research, particularly in the Middle Eastern region (Alsabawy et al., 2011; Bawakid et al., 2019). Additionally, the resource provides

valuable insights for Saudi Arabian scholars and practitioners seeking to enhance their research methodologies through the utilization of information and communication technologies (Asghar et al., 2021; Khalil et al., 2021). The outcomes of this study have the potential to assist policymakers and funding organizations in formulating strategies and initiatives aimed at promoting the adoption of information and communication technologies (ICTs) in social science research. This is because such technologies have been identified as a significant catalyst for innovation and knowledge creation, as evidenced by previous research conducted by Alshehri et al. (2020) and Alsultan et al. (2021).

Research Objective

The primary objective of the research is to identify the challenges and prospects associated with the utilization of Information and Communication Technology (ICT) in the field of social sciences within the context of Saudi Arabia.

Literature Review and Previous Studies

ICT adoption pertains to the integration and utilization of technology in research endeavors such as data gathering, analysis, and dissemination. The recognition of the capacity of Information and Communication Technologies (ICT) to enhance the outcomes of social science research has gained momentum in recent times. The utilization of this approach yields several benefits such as enhanced efficiency, improved accuracy of data, strengthened collaboration, and expanded research opportunities, as supported by Mehra et al. (2021). ICT tools and platforms such as online surveys, data visualization software, social media analytics, and collaboration platforms have been identified as expedient means by which researchers can obtain more insight into their work (Dahiya et al., 2020; Nambisan, 2017).

Despite the potential benefits, the widespread adoption of ICT in social science research is hindered by several obstacles. Various factors, including those related to technology, infrastructure, culture and society, and institutional structure, collectively contribute to these impediments.

The technological challenges that impede research progress can be attributed to various factors such as the intricacy of technology, inadequate technical expertise among researchers, and non-alignment with established research tools and methodologies (Kim et al., 2020; Teixeira et al., 2021). The limited familiarity and

dissatisfaction of researchers with the utilization of ICT technologies could impede their extensive implementation.

Infrastructure barriers refer to the constraints that arise from the limited accessibility and availability of information and communication technology (ICT) infrastructure, such as internet connectivity, hardware resources, and software compatibility. This definition is supported by previous studies conducted by LaPelle et al. (2018) and Olaniyi & Oyedele (2019). Insufficient infrastructure can impede research productivity, thereby limiting the ability of scientists to fully leverage the available information and communication technology (ICT) resources.

According to Hwang et al(2020) and Semaan (2019), cultural and social barriers may arise due to the attitudes, beliefs, and resistance to change exhibited by both researchers and study participants. Researchers may be discouraged from utilizing ICT due to various factors such as apprehensions regarding data privacy and security, reluctance to modify established research techniques, and a general lack of comprehension regarding the potential benefits of integrating ICT.

The implementation of ICT in research contexts is hindered by various factors, as noted in previous studies (Alsabawy et al., 2021; Bawakid et al., 2019). These factors include institutional restrictions, financial constraints, and insufficient support for ICT adoption. Insufficient financial resources, intricate administrative procedures, and inadequate training and support mechanisms pose significant challenges to researchers seeking to effectively incorporate ICT into their research endeavors.

In contrast to hindrances, facilitators enable social scientists to utilize ICT in their research endeavors. The facilitators can encompass a wide range of factors, including technological advancements, enhanced physical infrastructure, and more inclusive social and organizational standards.

Technological facilitators encompass a range of tools and resources, including user-friendly information and communication technology (ICT) tools, accessible technical assistance, and innovative breakthroughs that optimize research procedures (Khalil et al., 2021). If researchers are provided with tools that cater to their individual needs and proficiency levels, they are more inclined to utilize information and communication technology (ICT).

The facilitation of infrastructure involves the provision of superior information and communication technology infrastructure, which encompasses stable and rapid network connections, compatible software, and adequate hardware (Alshehri et al., 2020; Asghar et al. 2020). The presence of requisite infrastructure facilitates researchers'

access to and utilization of information and communication technology (ICT) tools in their scholarly pursuits.

According to Alhazmi et al. (2018) and Kim et al. (2020), cultural and social enablers encompass favorable attitudes towards adoption, advantageous information, and initiatives aimed at enhancing skills and capabilities. The utilization of Information and Communication Technology (ICT) is fostered by a research-oriented environment that promotes ingenuity, collaboration, and innovative methodologies.

Organizational facilitators refer to institutional policies and support systems that promote the adoption of information and communication technology (ICT), as noted by Bawakid et al. (2019) and Nambisan (2017). These systems may comprise specialized funding mechanisms, research stimuli, and technical assistance. The integration of Information and Communication Technology (ICT) among researchers is made possible through the emphasis and allocation of resources by institutions towards ICT infrastructure and training.

A comprehensive investigation has been conducted regarding the adoption of Information and Communication Technology (ICT) in Saudi Arabia.

The existing body of literature on the utilization of ICT in research is extensive; however, there is a notable scarcity of research conducted within the context of Saudi Arabia. Considerable research has been conducted on the challenges and opportunities present in Saudi Arabia.

Al-Aboud et al. (2021) conducted a study on the digital divide in Saudi Arabia and emphasized the importance of enhancing the ICT infrastructure to facilitate novel modes of knowledge generation. The authors highlighted the urgent requirement for enhanced infrastructure to enable the effective utilization of Information and Communication Technology (ICT) in academic settings.

Alsultan et al. (2021) conducted a study examining the factors that impact the implementation of e-learning in colleges in Saudi Arabia, including cultural and technological elements. The findings of their study indicated that the integration of ICT was more effective in cases where individuals had access to easily navigable technological resources, structured educational initiatives, and optimistic attitudes.

These studies offer initial insights into the facilitators and barriers to the dissemination of Information and Communication Technologies (ICTs) in Saudi Arabia. Nonetheless, a significant dearth of research exists pertaining to the utilization of information and communication technologies within the realm of social science research in Saudi Arabia. Hence, the objective of this study is to address the aforementioned gap by conducting a thorough examination of the

prospects and limitations encountered by social science researchers in the context of Saudi Arabia.

Methods

The present investigation employed a quantitative methodology to examine the facilitating and inhibiting factors that impact the utilization of technology among social scientists in Saudi Arabia. A structured questionnaire was employed to obtain insights from social science experts. The research process involved a series of steps, including the development of a questionnaire, recruitment of participants, data collection, and analysis of the obtained results.

The development of a well-structured questionnaire was informed by the study questions and prior literature on the utilization of information and communication technologies in social science research. The study administered a closed-ended questionnaire to the respondents, which inquired about their demographic information, current utilization of information and communication technology (ICT) in research, and their perspectives on the advantages and disadvantages of integrating ICT. The interrogatives were formulated with the intention of eliciting specific and practical responses that can be subjected to quantitative analysis.

This study focused on examining individuals who are scholars and experts in the field of social sciences, originating from Saudi Arabia. The recruitment of individuals for research purposes was conducted through the utilization of purposeful sampling, whereby individuals who possessed prior familiarity or experience with information and communication technology (ICT) were targeted. The study participants were drawn from diverse social scientific disciplines, such as sociology, psychology, economics, and politics. Prior knowledge of the subject matter and pertinent professional background were mandatory criteria for individuals to take part.

The electronic questionnaire was distributed to the selected participants through online survey platforms. A\\\\ correspondence was dispatched to every participant delineating the objectives of the study, the significance of their voluntary participation, and the confidentiality of their responses. Participants were allocated specific time frames to complete the survey, and periodic prompts were employed to incentivize maximum participation. The objective of this data gathering endeavor was to assemble a comprehensive and inclusive sample of social science scholars operating within the confines of Saudi Arabia.

The data analysis involved the application of both descriptive and inferential statistical methods. The demographic data and survey responses of the participants were analyzed through the use of

descriptive statistics, including frequency distributions, percentages, means, and standard deviations. The study employed inferential statistics, specifically chi-square tests and correlation analyses, to explore potential associations among the variables of interest. Statistical software such as SPSS was utilized for this objective.

Results

Table 1: Current Adoption of ICT in Research

ICT Adoption Variable	Frequency	Percentage
Regularly	120	60%
Occasionally	60	30%
Rarely	20	10%

Table 1 displays the frequency and degree to which individuals are utilizing information and communication technology (ICT) in their current academic pursuits. The available options for selection are "Regularly," "Occasionally," and "Rarely." The study revealed that a majority of the participants, specifically 60%, frequently utilized information and communication technology (ICT) in their academic pursuits. A smaller proportion of the participants, comprising 30%, reported occasional usage of ICT, while a mere 10% indicated infrequent utilization of the technology.

Table 2: Perceptions of Barriers to ICT Adoption

Barrier	Frequency	Percentage
Technological Complexity	80	40%
Lack of Technical Skills	70	35%
Compatibility Issues	50	25%
Data Privacy and Security Concerns	90	45%
Resistance to Change	40	20%
Limited Resources and Funding	60	30%

Table 2 presents the frequency and percentage distribution of participants' perspectives regarding the difficulties associated with employing ICT in social science research. The table enumerates various obstacles such as resistance to change, insufficient financial and material resources, inadequate technical proficiency, and issues related to compatibility. The intricacy of technology was identified as a hindrance by 40% of participants, whereas 35% of respondents cited insufficient technical expertise as a barrier.

Table 3: Perceptions of Facilitators for ICT Adoption

Facilitator	Frequency	Percentage
User-Friendly ICT Tools	100	50%
Training and Support Programs	90	45%
Availability of Resources	70	35%
Organizational Support	80	40%
Positive Attitudes towards ICT	60	30%
Collaboration and Networking	50	25%

Table 3 presents a comprehensive analysis of the frequency and percentage distribution of respondents' perceptions regarding the extent and intensity to which specific factors facilitated the utilization of ICT in social science research. The aforementioned chart delineates various facilitative elements, including but not limited to easily accessible information and communication technology (ICT) tools, comprehensive training and support initiatives, abundant resources, institutional support, a positive attitude towards the significance of ICT, and prospects for collaborative efforts and professional networking. Ninety participants, constituting 45% of the sample, recognized the importance of training and support programs, whereas 100 participants, accounting for 50% of the sample, cited user-friendly ICT products as a facilitator.

Table 4: Correlation Analysis between ICT Adoption and Research Productivity

	ICT Adoption	Research Productivity
ICT Adoption	1.000	0.624**
Research Productivity		1.000

Table 4 displays the results of a correlation analysis conducted to examine the relationship between the utilization of information and communication technology (ICT) and the productivity of scholarly research. The table displays the correlation coefficients between the two variables. The correlation coefficient of 0.624 suggests a moderate positive correlation between the variables of ICT usage and research output. The utilization of asterisks is a common practice in denoting statistical significance, where a value of ** is indicative of a p-value of 0.01.

Table 5: Chi-Square Test of Independence - ICT Adoption and Academic Discipline

	ICT Adoption	No ICT Adoption	Total
Sociology	30	20	50
Psychology	40	30	70
Economics	15	15	30

Political Science	25	25	50
Total	110	90	200

Table 5 displays the results of the chi-square test for independence conducted to examine the relationship between ICT usage and major. The presented table displays the percentages of adoption and non-adoption of Information and Communication Technology (ICT) within various academic disciplines. The final column displays the aggregate frequency. The present study aims to investigate the existence of a statistically significant association between the utilization of Information and Communication Technology (ICT) and specific academic disciplines. In the event of a statistically significant association, the outcome of the chi-square test will indicate as such.

Table 6: Mean Comparison of ICT Adoption by Age Group

	Mean ICT Adoption
20-30 years	4.2
31-40 years	4.8
41-50 years	4.5
Above 50 years	4.0

Table 6 presents a comparison of mean ratings pertaining to the adoption of Information and Communication Technology (ICT) across different age groups. The following table presents the mean percentage of individuals within specific age cohorts who have implemented information and communication technology (ICT). The age group ranging from 31 to 40 years old had the highest mean score for ICT adoption (4.8), while the age group ranging from 41 to 50 years old had a slightly lower mean score of 4.5. The table presented below offers insights into the potential relationship between age and the adoption of information and communication technology (ICT).

Table 7: Independent Samples t-test - ICT Adoption by Gender

	Mean ICT Adoption	**Standard Deviation**	**t-value**	**p-value**
Male	4.2	0.9	2.34*	0.021
Female	4.6	0.8		

Table 7 displays the outcomes of an independent samples t-test that contrasts the levels of ICT adoption between males and females. The table incorporates statistical measures such as means, standard deviations, t-values, and p-values to assess the level of ICT adoption. The sample data indicates that the average score for the adoption of ICT among male participants was 4.2, while the average score for female participants was 4.6. At a significance threshold of $p = 0.05$, the t-value (2.34) indicating the extent of differentiation between two groups, is deemed statistically significant.

Discussion

The findings of this study offer significant perspectives on the potential advantages and obstacles of employing information and communication technology (ICT) in the field of social science research within the context of Saudi Arabia. The incorporation of quantitative analysis has contributed to the field of social science research on ICT adoption by elucidating the associations and disparities among various factors. This section will examine the importance of the findings and their possible practical implications, highlighting their distinctive contributions to the existing body of literature. The assertions put forth during the debate will be substantiated by citations.

The research results indicated numerous challenges that impede the effective utilization of information and communication technology (ICT) in social science research within the context of Saudi Arabia. According to Haddad et al. (2020) and Al-Rahmi et al. (2018), a significant challenge reported by 40% of the participants in Table 3 was related to technological complexity. The aforementioned finding highlights the importance of enhancing the accessibility of technology and simplifying the intricate technical aspects of information and communication technology (ICT) tools to augment their adoption rates.

According to Alzahrani et al. (2017), Table 3 indicates that 35% of the participants identified a deficiency in technical expertise as a hindrance. This underscores the necessity for initiatives and endeavors aimed at enhancing researchers' proficiency in effectively utilizing ICT technologies through training and education.

According to Almutairi & Subramanian (2021) and Alshehri et al. (2020), the data presented in Table 3 indicates that 45% of participants expressed concerns regarding data privacy and security as a factor contributing to their decision to not adopt ICT. The aforementioned conclusion emphasizes the necessity of implementing robust regulations for safeguarding data, ensuring adherence to relevant laws, and enhancing researchers' awareness regarding the importance of maintaining the confidentiality and safety of their data.

The investigation additionally revealed significant facilitating elements that have the potential to enhance the utilization of information and communication technology in social science research. According to the findings presented in Table 4 of the studies conducted by Alzahrani & Rahman (2018) and Alshahrani et al. (2019), 50% of the participants identified user-friendly information and communication technology (ICT) tools as a significant facilitator. The aforementioned underscores the necessity for enhanced utilization and adoption of information and communication technology (ICT) instruments among researchers

through the development of user-friendly and uncomplicated interfaces.

According to Alharbi et al. (2020) and Alqahtani & Gulliver (2019), the data presented in Table 4 indicates that 45% of the participants reported finding the training and support programs to be beneficial. The aforementioned finding underscores the necessity of furnishing researchers with ample opportunities for training and ongoing technical support to enhance their information and communication technology (ICT) competencies and surmount any hindrances that may impede adoption.

According to the findings presented in Table 4, a significant proportion of survey participants, specifically 40%, identified organizational support as a crucial facilitator. This observation is consistent with the conclusions drawn by Alqahtani and Gulliver (2019) as well as Alshehri et al. (2020). This fact underscores the significance of institutions and organizations in establishing a conducive environment for the utilization of ICT in social science research.

According to the data presented in Table 1, there exists a moderate positive correlation ($r = 0.624$) between the utilization of ICT and a rise in research productivity. The findings suggest that scholars in the field of social sciences who utilize information and communication technology (ICT) to a higher degree exhibit greater overall productivity, as evidenced by studies conducted by Almutairi and Subramanian (2020) and Alharbi et al. (2020). The utilization of ICT technologies may potentially enhance research productivity, data analysis proficiency, and opportunities for collaborative work.

The study examined the impact of demographic factors such as age, gender, and income on individuals' propensity to adopt information and communication technologies (ICTs). According to Alharbi et al. (2020) and Alshehri et al. (2020), Table 3 indicates variations in the mean scores for ICT adoption among various age cohorts. Notably, the age group ranging from 31 to 40 years exhibited the highest average score. The aforementioned findings highlight the importance of age as a factor influencing the adoption of information and communication technology (ICT). They imply that individuals who are younger in age may exhibit greater receptiveness and familiarity towards the advantages of leveraging ICT resources.

The adoption of ICT displays notable variations based on gender, as evidenced by an independent samples t-test (Table 4), with women exhibiting a higher mean score (Almutairi & Subramanian, 2021; Alqahtani, 2019). The data indicates that there is a growing trend of open adoption among female academics in the Saudi Arabian context, which contradicts the notion that the adoption of information and

communication technology (ICT) may be biased towards male researchers.

Conclusion

The study's findings contribute to the field of ICT adoption in social scientific research by presenting empirical data and policy-relevant implications for researchers, institutions, and policymakers. The results emphasize the importance of implementing ICT tools that are easy to use and providing comprehensive training programs to address challenges such as technological intricacy and insufficient technical proficiency. Organizations have the potential to exert a substantial influence on the adoption and utilization of information and communication technologies (ICT) among researchers. This can be achieved by furnishing essential resources and cultivating a supportive environment.

The findings of the correlation analysis indicated a positive association between the utilization of information and communication technology (ICT) and research productivity, highlighting the potential benefits of integrating ICT tools in social science research. The utilization of Information and Communication Technology (ICT) in research procedures has yielded favorable outcomes such as enhanced research efficiency, improved data analysis skills, and increased prospects for cooperation.

The present study examined the impact of demographic factors, specifically age and gender, on the adoption of information and communication technology (ICT). It was found that these variables had a significant influence on the adoption of ICT. Empirical data suggests that female academics are increasingly adopting inclusive information and communication technology (ICT) practices, thereby challenging gender stereotypes. Additionally, there is a prevailing inclination among younger researchers to utilize ICT tools more frequently.

The study exhibits several limitations that warrant acknowledgment. The generalizability of the findings beyond the distinct context of Saudi Arabia may be constrained, given the utilization of self-reported assessments. It is advisable that forthcoming investigations employ qualitative methodologies and expand their purview to encompass diverse cultural contexts.

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