



Information and communication technology applications and their role in providing telecommuting job opportunities: A practical study on the private sector in Riyadh southern provinces



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ABSTRACT

This study examines: (1) the relationship between modern ICT applications and telecommunications in providing telecommuting job opportunities, (2) the differences among the average responses of the sample for modern applications of ICT based on sector type and company size, and (3) the relative importance of private sector preferences for modern ICT applications among private sector incorporating in Southern Riyadh provinces. The final sample of this study consists of 124 CEOs, managers, and deputy managers from 80 companies. Using a survey-based method in 2017, the results of this study indicate that the mastery of job seekers for ICT applications (combined) provides telecommuting job opportunities in the study sample city with an average of (3.14); the mastery of job seekers for (chat applications) provides telecommuting job opportunities in the study sample with an average of 3.96; the mastery of job seekers for work-from-home applications (virtual classroom applications and remote assistance applications) provides telecommuting job opportunities in the study sample with an average of 3.57; the mastery of job seekers for computer programs (office software) provides telecommuting job opportunities in the study sample with an average of 3.95; the mastery of job seekers for accounting and statistics programs does not lead to providing telecommuting job opportunities in the study sample as the average was 2.98; the mastery of job seekers for social networking applications (social networks) provides telecommuting job opportunities in the study sample, where the average was 3.62; the mastery of job seekers for designing programs provides telecommuting job opportunities in the study sample, with an average of 3.40; the mastery of job seekers for engineering planning programs does not lead to providing telecommuting job opportunities in the study sample, as the average was 2.14; and the existence of such kind of differences is due to demographic characteristics and their impact on the use of ICT applications.

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1. Introduction

Nowadays the world is witnessing a realistic change along with rapid dynamic developments in the field of modern Information and Communication Technology (henceforth ICT) applications, which are widely used individually and practically. The

combination of ICT and telecommunications lead to new and modern ways of conducting business and opened up new horizons for providing tele-employment opportunities that serve both jobseekers and business organizations. These modern technological applications enable different organizations to increase productivity, and to reduce costs and time while performing such tasks. At the same time, mastering these applications represents telework opportunities for individuals who, due to certain social factors, were prevented from pursuing work and increasing their financial income in accordance with their social conditions (Basile and Beauregard, 2016; Raja et al., 2013; Martin and MacDonnell, 2012).

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In the Saudi context, [Abu Hassan and Ashummary \(2016\)](#) explored the implementation of telework for Saudi women in travel agencies of Saudi Airlines. They found that Saudi female telework is acceptable among the sample and it contributes to the decrease of unemployment rate which, in turn, benefits the Saudi society. [Al-Rasheed \(2009\)](#) investigated the attitudes of Saudi women toward teleworks. He found that Saudi women played an active role in the professional work system and showed considerable flexibility regarding the methods and approaches of work that allowed them to express themselves while retaining their religious and social heritage. Further, [Al-Rasheed \(2005\)](#) examined the perceptions of teleworks and how such perceptions affect companies, individuals and community in Saudi Arabia. The governmental and private organizations were motivated to adopt the method of working remotely and the Saudi environment to the necessary components, where information and communication programs are available. The study found that the method of teleworks would be an effective organizational framework in the recruitment and work of Saudi women in line with the provisions and traditions of Saudi society. The adoption of a teleworking approach would create real opportunities for the employment of disabled individuals. The study also highlighted the possibility of rejection of the adoption of the teleworks by some managers, especially the elderly.

In essence, there is still a paucity of research in the Saudi context regarding the telework issues. Therefore, this study seeks to fill in such gap by investigating the telework issues in the Saudi context using a recent data. Therefore, it explores: (1) the relationship between modern ICT applications and telecommunications for providing telecommuting job opportunities; (2) the differences among the average responses of the sample of modern ICT applications based on sector type and company size; and (3) the relative importance of private sector preferences for modern ICT applications. The current study is significant as it: (1) utilizes modern ICT applications for providing telecommuting job opportunities and reducing unemployment resulting from social conditions that prevent some of the skilled people from joining permanent jobs; (2) promotes the progress of private sector organizations based on modern ICT applications for improving their performance and reducing their costs of productivity Riyadh southern provinces; (3) highlights the role of modern ICT applications in business performance and the compatibility between the concepts of real organization and virtual organization; (4) helps training centers to determine the type of applications that are in need of designing training programs to qualify the members of their community; and (5) highlights the upcoming features of the concept of teleworking in Saudi society.

The remainder of this study is organized as follows. Section 2 provides a review of related studies and states study hypotheses. The data and

methodology are outlined in section 3. Section 4 covers the empirical results, discussion and implications; and section 5 provides a conclusion to the current study.

2. Literature review

2.1. Information and communication technology (ICT)

The rapid developments in ICT applications in recent decades profoundly affected global economy in various societies through fundamental changes in the concepts of trade and employment, patterns of production, distribution and different living conditions. Remote work is considered one of those concepts which is a natural manifestation of this rapid development, whereas ICT applications have provided new opportunities for business organizations to take advantage of human resources to accomplish tasks remotely at lower costs and in due time.

Information technology refers to a set of computers, supporting equipment, software, services and associated resources that are used to support the workflows, which facilitate the use of generated, stored and shared digital information ([McNabb, 2006](#)). It is also defined as new and highly efficient styles and methods for the exchange of information among all users using computers, faxes, wired telephones and the Internet ([McConnell et al., 2009](#)).

2.2. ICT applications

ICT applications are those software applications, including software/hardware systems, used in the execution of tasks using computers and ICTs. Because of the large number of such applications, the researchers categorized them into seven groups; each group contains the most common applications in the Arab World These groups are (1) Chatting applications (2) Remote work applications, (3) Office software applications, (4) Accounting and statistical applications, (5) Social networking applications, (6) Design and montage applications, and (7) Engineering planning applications.

Due to the novelty and efficacy of social networking applications, most organizations have been enthusiastic to make use of them in order to advertise and reach the largest number of customers. According to (www.statista.com), the number of users of social networks in January 2016 reached 53% of the total population of Saudi Arabia. South Korea ranked first with 76% of the total population, followed by United Arab Emirates with 68% and then Hong Kong.

According to the statistics for the fourth quarter of the year 2015 (www.statista.com) the WhatsApp application ranked first with reference to the number of users in Saudi Arabia, followed by Facebook. [Table 1](#) shows the distribution of population use in Saudi Arabia for social networks.

The use of the internet in Saudi Arabia is increasing continuously, as the number of users rose to about 21 million (66% of the population) at the end of the second quarter of the year 2015, according to the statistics of the Ministry of Communications and Information Technology (www.cict.gov.sa).

Table 1: Distribution of using social networks by population in the Kingdom of Saudi Arabia (KSA)/ Number of social networks users in the Kingdom of Saudi Arabia

Applications	Users (% of Pop.)
Linkedin	11
Line messenger	12
Snapchat	13
Skype	14
Google+	15
Instagram	17
Twitter	20
Facebook messenger	20
Facebook	25
Whatsapp	27

2.3. Telework

2.3.1. The concept of teleworking

Teleworking is commonly defined as "the work that needs to be performed somewhere away from the office, whether the nature of the work is complete or partial or on certain days and communication is usually electronic rather than personal." In 1990, the International Labor Organization (ILO) developed a definition of telework based on two concepts: Remote work and the use of new technology ([Martino and Wirth, 1990](#)). Hence, the telework may be defined as work carried out in a location where, remote from central offices or production facilities, the worker has no personal contact with co-workers there, but is able to communicate with them using new technology.

The European Union has defined telecommuting as "a form of organizing and/or performing work, using information technology, in the context of an employment contract/relationship, where work, which could also be performed at the employer's premises, is carried out away from those premises on a regular basis ([Schadler et al., 2016](#)). In brief, teleworking refers to the implementation of work or the completion of tasks away from the workplace through the use of information and communication technology applications.

2.3.2. Advantages of teleworking

One of the reports of the International Labor Organization (ILO) shows that 'The High Road to Teleworking', refers to many benefits to society, institutions and employees as a result of the application of the concept of telecommuting, providing a greater opportunity to invest time well in social and humanitarian forms. It plays a very important role to bring the same family members all together for a longer time; it also becomes very

useful for working women who care for their children. In cases of long-term sick leave, the employee can take advantage of his or her time without work difficulties or physically disabled people who cannot reach the workplace and cannot work in an environment that is not suitable to their own needs. [Martino \(2001\)](#) indicated that teleworking can benefit the society, organization and staff.

Many countries have been recently interested in making use of "telecommuting" because of the advantages for both parties (employee and institution). [Table 2](#) shows the increasing interest in teleworking around the world, and has been used in the preparation of the reference infographic ([Schadler et al., 2016](#); [Hill, 2012](#); [Sandrine, 2012](#)).

Table 2: Extent of interest in teleworking around the world

Countries	Teleworkers (%)
The European Union	18
USA	23
Indonesia	34
Scandinavian	43

The Kingdom of Saudi Arabia has a good infrastructure for ICT with a vast area of land, a large number of young male and female labor, and a low unemployment rate (11.7%). The number of unemployed Saudis reached 651305: 25,880 males and 392425 females (www.moh.gov.sa). In addition, percentage of women who stay at home to care for the families and attention to their affairs is markedly high. Therefore, young people and girls who are skilled at dealing with ICT applications might be able to gain more jobs opportunities in the telecommuting market which is booming.

Based on these figures, it is obvious that the mastery of IT applications and communications will benefit the regions located at south of Riyadh as they would provide work for housewives and people with special needs, and facilitate traffic especially for women since teleworking is appropriate for the privacy of women in Saudi society.

In terms of empirical studies conducted on teleworks, [Abu Hassan and Ashummary \(2016\)](#) explored the applicability of teleworking for Saudi women in the tickets and reservations offices of Saudi Arabian Airlines. The study concluded that there is a possibility of applying teleworking to the Saudi Arabian Airlines because of the high technical capabilities which revealed the acceptance of the application of this system by the sample members. This system provides benefits for women such as providing job opportunities that are suitable for the nature of women, benefits for society such as reducing unemployment rates among women, and benefits for companies being a tool for reducing costs and contributing to building societies.

[Martin and MacDonnell \(2012\)](#) adopted a multidisciplinary approach to report the effects of telework on organizational outcomes with the aim of providing a clearer answer to the question: is telework effective for organizations? The study

found that there is a small but positive relationship among telework and organizational outcomes, with the caveat that certain variables may lead to greater benefits, where others may diminish them. As such, organizational decision makers may want to take heed, for if the use of ICT outside the central office can indeed help organizations be more productive, strengthen organizational commitment, secure employee retention, and improve performance, the decision of whether or not to implement a telework program could be the factor that determines whether or not an organization becomes part of that future or a thing of the past.

Walls et al. (2007) conducted a survey on the Southern California residents to evaluate the relative importance of factors which affect workers' propensity to telecommute and telecommuting frequency. The survey collected a wealth of individual demographic information as well as job type, industry, and employer characteristics from about 5,000 residents. The survey found that where an individual works and the job he or she holds are quite important in explaining the likelihood that he or she telecommutes.

Particular industries appear to be more likely to have telecommuters, and certain types of jobs are more conducive to telecommuting, in particular jobs in sales, education and training, and architecture and engineering. In contrast, some jobs—for example, those in health care—are less conducive to telecommuting. Individuals who work at mid-size companies (those with 25–250 employees) are less likely to telecommute than individuals who work at very small companies (<25 employees) or very large companies (>250 employees). Furthermore, the survey found that education, age, and race are all statistically significant in explaining telecommuting behavior.

Al-Rasheed (2005) explored the possibilities of applying the method of teleworking in Saudi Arabia and its potential impact on society, companies and individuals. The study revealed that the governmental and private organizations have motivated the adoption of the method of teleworking, and that the Saudi environment has the necessary components, where information and communication programs are available. The study also concluded that the method of working remotely will be an effective organizational framework in the employment and work of Saudi women in compliance with the provisions and traditions of Saudi society. The adoption of teleworking will also create real opportunities for the employment of disabled individuals. Some managers, especially the elderly, were reported for rejecting the adoption of teleworking. The study recommended that the Ministry of Labor and Social Affairs should seek to reformulate the regulations and legislations that regulate the method of teleworking.

Al-Rasheed (2009) investigated the possibility of applying a proposed approach to women's teleworking based on work from home to identify the attitudes of Saudi women to teleworking and to

analyze the motives which stimulate them to do so. The ability of Saudi women to play an active role in the professional work system, and their flexibility to respond to the methods of work that allow them to express themselves while retaining their religious and social heritage are among the most important findings of the study. The study recommended presenting experiences of women from other societies who were able to achieve personal and family benefits through teleworking. In addition, the chambers of commerce should organize conferences and seminars on the subject of teleworking.

Based on the above discussions, the following testable hypotheses are developed:

- **H₁**: The mastery of job seekers for ICT applications (combined) provides telecommuting job opportunities. The following sub-hypotheses are derived from the first hypothesis:
- **H_{1a}**: The mastery of job seekers for (chat applications) provides telecommuting job opportunities in the sample study
- **H_{1b}**: The mastery of job seekers for work-from-home applications (virtual classroom applications and remote assistance applications) provides telecommuting job opportunities in the sample study
- **H_{1c}**: The mastery of job seekers for computer programs (office software) provides telecommuting job opportunities in the sample study
- **H_{1d}**: The mastery of job seekers for accounting and statistics programs provides telecommuting job opportunities in the sample study
- **H_{1e}**: The mastery of job seekers for social networking applications (social networks) provides telecommuting job opportunities in the sample study
- **H_{1f}**: The mastery of job seekers for designing programs provides telecommuting job opportunities in the sample study
- **H_{1g}**: The mastery of job seekers for engineering planning programs provides telecommuting job opportunities in the sample study
- **H₂**: There are statistically significant differences ($\alpha < 0.05$) among the averages of modern ICT applications in Saudi private sector organizations due to (age, academic qualification, years of work experience, profession, the nature of company or organization activities as well as the number of staff in the organization).

3. Data and methodology

3.1. Population, sample, and study tool

The study population represents all executives, managers and deputies in the private sector companies in the southern provinces of Riyadh city (80 companies). These companies formed the general framework, which the elements of the total study population were distributed on. The number of elements of the study population reached 240

persons. In order to find a high degree of representation of the study population, based on the objectives and hypotheses of the study, the study samples were selected using the study sample size formula. Accordingly, 148 questionnaires were distributed. A response rate of 83.78 percent was obtained after excluding the incomplete questionnaires which were not returned, and outliers, leaving a total of 124 questionnaires to be used for data analysis.

The study tool was a questionnaire which is a research instrument consisting of a series of questions (or other types of prompts) for gathering information from respondents. The items of the questionnaire consisted of two main parts as follows:

Part 1 contains the identification data of the respondents and the characteristics of the surveyed organizations which are determined by (13) items.

Part 2 is devoted to measuring the variables of the study and consisted of 62 items distributed as follows:

- Chatting applications, measured by items (1-4)
- Remote work applications, measured by items (5-11)
- Office software applications, measured by items (12-18)
- Accounting and statistical applications, measured by items (19-27)
- Social networking applications, measured by items (28-45)
- Design and montage applications, measured by items (46-58)
- Engineering planning applications, measured by items (59-62)

3.2. Statistical methods used in the study

The Statistical Package for Social Sciences (SPSS) was used to process data, test hypotheses, and answer the question of the study. The other methods that were used included: (1) Cronbach's Alpha to calculate the stability of the tool, (2) Corrected Item-Total Correlation to measure the internal consistency of the tool, (3) Means and Standard Deviations to measure the level of employees' values in the Saudi private sector and their degree of compatibility with these values, (4) (t) Test (One-Sample t Test) to test the first main hypothesis, (5) ANOVA (One-way and two-Sample independent t Test) to test differences according to demographic variables in the case of homogeneity of samples, (6) Tukey HSD test to determine the sources of differences according to demographic variables.

3.3. Reliability and validity tests

To achieve the validity of the tools and to ensure the accuracy of the measurement items, the researchers used the following tests:

3.3.1. Face validity

Face validity refers to the general appearance of the scale which is achieved by presenting it to a number of reviewers. The opinions of the reviewers and their observations on the items and their validity have been taken into consideration. The necessary adjustments have been made according to their views.

3.3.2. Internal consistency

The researchers relied on a 40-statement sample to extract the internal consistency using the Cronbach's Alpha formula. The total consistency of the scale was (0.93). Thus, the scale was finalized. This prompted the researchers to conduct a field study on the study sample.

4. Results, discussions, and implications

4.1. Statistical analysis of the characteristics of the study sample

The respondents profile is shown in [Table 3](#) that depicts the following information about the sample characteristics:

- **Gender Variable (male-female):** The number of male respondents is (110) representing 11.3% of the study, while the number of females is (14) representing (11.3%). The high ratio of males to females can be considered natural, where the social factors reduce the level of female employment are taken into account, especially as the respondents are leaders (executives, directors and deputies).
- **Age variable:** The number of respondents whose age is less than 30 years is 52 persons which represents 41.9% of the sample; whereas, the number of the respondents whose age ranges from 30 to less than 40 years is (52) persons which represents 43.5%; however, the number of respondents whose age ranges from 40 to less than 50 years is 11 persons that represents 8.9%; whereas, the number of respondents whose age ranges from 50 years and over is 7 persons which represents 5.6%. This indicates that 85.4% of the leadership positions in the private and charitable sectors are occupied by youth. This is consistent with the nature of the development of the private sector in the KSA. Also, it reflects the high degree of involvement of young people in the private and charity sector.
- **Scientific qualifications variable:** The number of those samples who are postgraduates is 9 persons who represent 7.3% of the sample. Whereas, those who have B.A. degrees are (62) persons who represent 50%. However, those who have diploma degrees are 25 persons with the percentage of 20.2%. Those who have secondary school degrees represent 22.6%. The result shows that there is a great demand for scientific qualifications for

acquiring the leading jobs; whereas the B.A. degree is considered a basic requirement for obtaining high positions in the field of study. It is also noticed that high school graduates are less interested in using ICT applications. Furthermore, there are so many postgraduates who joined private and charitable economic sector, as their percentage is still low if compared with secondary school

holders. This result shows that there is a great indication of developing the private charitable sector in Saudi Arabia and that the increase of high qualified persons constitutes a very important role to cope with development in using modern techniques such as telecommunicating applications.

Table 3: Respondents profile

Variable	Category	Frequency	Percent (%)
Gender	Male	110	88.7
	Female	14	11.3
Age	Less than 30 years	52	41.9
	From 30 To Less than 40	54	43.5
	From 40 To Less than 50	11	8.9
	From 50 and over	7	5.6
	Graduate	9	7.3
Educational Qualification	BA	62	50.0
	Diploma	25	20.2
	High Secondary	28	22.6
	Less than 5 years	30	24.2
Years' Work Experience	From 5 to Less than 10 Years	47	37.9
	From 10 Years and Over	47	37.9
	Executive Director	53	42.7
Job Grade	Director of Organization	27	21.8
	Vice	44	35.5
	Commercial	71	57.3
	Educational	17	13.7
The company's activity	Charitable	21	16.9
	Medical	15	12.1
	Less than 5 years	23	18.5
	From 5 to Less than 10 Years	31	25.0
Organization years' experience	10 Years and Over	70	56.5
	Less than 10 employees	28	22.6
	From 10 to 20	16	12.9
	From 21 to 50	23	18.5
	Up to 50 employees	57	46.0
Using ICT in Organization	Very high	56	45.2
	High	33	26.6
	Average	35	28.2
	Weak	0	0
Required mastering ICT Apps	as a prerequisite	42	33.9
	Yes	64	51.6
	No	18	14.5
	Continuously if necessary	56	45.2
Train employees on ICTApps	Sometimes	37	29.8
	Rarely	14	11.3
	No	17	13.7
	No	0	0
Allowed Telework in organization	Yes	32	25.8
	No	69	55.6
	If necessary	23	18.5
	Yes	25	20.2
Telework Availability in Organization	Yes, but for specific tasks	26	20.97
	No	73	58.9

- **The variable of years of experience at work:** It is noticed that the number of respondents whose work experience is less than 5 years is 30 persons which represents 24.2% of the total number of the sample; whereas, the number of the persons whose work experience ranges from five to less than ten years is 47 which represents 37.9%; whereas, those who's their experience is more than 10 years are (47 persons) which represents 37.9%. This result shows that the average of experience increase for the leading officials in both private and charitable sectors.
- **Job grade variable:** It's noticed that the number of sample executives is high (53 persons) as it represents 42.7%. However, the number of sample

managers is 27 persons which represents 21.8%. Whereas, the number of sample deputies is 44 persons which represents 35.5%. This means that the private business and charitable sector is often run by higher boards that set policies and guidelines for executive managers. This result reinforces the high percentage of deputies compared with the low percentage of managers who have sufficient powers, which may be reflected in the limited power of remote recruitment.

- **The company's activity variable:** It is noticed that the number of sample of organizations with commercial activity is 71 persons who represent 57.3% of the sample of the study; whereas, the

number of the sample of organizations with educational activity is 17 persons who represent 13.7%. However, the number of the sample of charitable organizations is 21 persons which represents 16.9% approximately. The sample of companies or organizations with medical activity was 15 persons which represents 12.1%. This result may reflect the size and nature of the economic activities prevailing in the governorates of south Riyadh, where the commercial activity comes first at the expense of other economic activities.

- **Organization years of experience variable:** It is noticed that in the number of organizations whose experience is less than 5 years is 23 organizations which represents 18.5% of the sample of the study; whereas, the number of the sample of organizations whose experience ranges from five to less than ten years is 31 organizations which represents 25%; whereas, those whose experience is more than 10 years are 70 organizations representing 65.5%. This result may reflect the expansion of traditional economic activities, while new activities still have limited experience.
- **Variable of the number of employees in the organization:** It is noticed that the number of organizations encompassing less than 10 employees is 28 organizations which represents 22.6% of the sample of the study; whereas, the number of sample members in organizations whose personnel ranges from 10 to 20 employees is 16 organizations, representing 12.9%; however, the number of sample members in organizations whose staff ranges from 21 to 50 is 23 organizations, which represents 18.5%. While the number of sample members in organizations with more than 50 staff is 57 organizations with the percentage of 46%. This result shows that the majority of business organizations are large organizations, and that they offer more jobs; and therefore could expand their activities to use telework applications.
- **Variable of using ICT in Organization:** It is noticed that the number of sample members in organizations that use ICT applications related to their activities is 56 organizations that represents 45.2% of the sample of the study (very high); while the number of sample of organizations that use ICT applications related to their activities is 33 organizations representing 26.6% (high); however, the number of sample of organizations using ICT applications related to their activities is 35 organizations, representing 28.2% (average), whereas the number of sample of organizations that use ICT applications related to their activities is zero (weak). This finding indicates that business organizations are working to keep up with the scientific developments in the field of ICT applications in its work.
- **Required mastering ICT Apps variable:** The results showed that the number of sample of the organizations that require mastery ICT applications from applicants for job vacancies, as a

"prerequisite" is 42 organizations that represents 33.9% of the sample of the study; whereas, the number of sample of organizations that require mastery ICT applications from applicants for job vacancies to perform job tasks is 64 organizations representing 51.6%; however, the number of sample in organizations that do not require mastery ICT applications from applicants for job vacancies to carry out the job tasks is 18 organizations which represents 14.5%. This finding confirms the previous results.

- **Train employees on ICT Apps:** It is noticed that the number of sample of the organizations that train their employees "continuously" on the skills of using information and communication technology is 56 organizations which represents 13.7% of the total number of the sample; whereas, the number of sample of the organizations that train their employees "when necessary" on the skills of using information and communication technology is 37 organizations representing 45.2%; and the number of sample of the organizations that "sometimes" train their employees on the skills of using information and communication technology is 14 organizations which represents 29.8% of the sample; however, the number of sample in the organizations that "rarely" train their employees on the skills of using information and communication technology (17 organizations) includes (11.3%) approximately; whereas the number of sample of organizations that "don't" train their employees on ICT skills is zero. These results reflect an increasing interest in training which can be traced back to the nature of ICT applications and the need for training.
- **Allowed Telework in organization:** It is noticed that the number of the sample in the organizations whose system "allows" the employees to carry out the tasks of the job, from outside the official workplace (i.e. remotely) through the relevant ICT applications is 32 organizations which represents (25.8%) of the total number of the sample; while the number of sample in organizations whose system "does not allow" the employees (or some of them) to carry out the tasks of the job, from outside the official workplace (i.e. remotely) through the relevant ICT applications (69 organizations) with a percentage of (55.6%); whereas the number of sample in organizations that "allowed when necessary" their employees (or some of them) to carry out the tasks of the job, from outside the official workplace (i.e. remotely) through the relevant ICT applications (23 organizations) with a percentage of 18.5%. These results show that a large percentage of business organizations in the southern governorates of Riyadh are still far from the concept of teleworking, and that there are starting to benefit from the applications of ICT in teleworking.
- **Telework availability in organization:** It is also noticed that the number of sample in organizations that have employees carrying out "their tasks of the job" permanently and remotely is 25 persons

with a percentage (20.2%) approximately from the total number of the sample; however, the number of sample in organizations that have employees carrying out "some of their tasks of the job" permanently and remotely is 26 persons which represents (20.97%) of the sample; whereas the number of sample in organizations that have employees "do not carrying out their tasks of the job" permanently and remotely is 73 persons representing 58.9% of the sample; This result is consistent with the previous result and confirms that there is a considerable change in private and charitable organizations in the use of ICT applications in teleworking.

4.2. The test of hypotheses

To verify the first main hypothesis test which states that "The mastery of job seekers for ICT applications (combined) provides telecommuting job opportunities in the study sample", the means of the sample were compared with hypothetical average which is approved in the study that includes 3 parameters using *t*-test for one sample.

The statistical data shown in Table 4 shows there is an evidence of statistically significant differences between the sample average and the hypothetical average which is approved in the study that includes 3 parameters.

Table 4: Mean, standard deviation, the mean difference and *t*-test for one sample

Mean	Std. Dev	Mean Difference	<i>t</i>	Sig.
3.14	0.595	0.413	7.713	0.000

The differences were in favor of the sample average. This is confirmed by the results of *t*-test for one sample where the mean difference is 0.413 which is statistically significant ($\alpha < 0.05$). This indicates that the mastery of job seekers for ICT applications (combined) provides telecommuting job opportunities in the study sample. Thus, Hypothesis H_1 is accepted.

Regarding the first sub-hypothesis (H_{1a}) which states that "The mastery of job seekers for (chat applications) provides telecommuting job opportunities in the study sample", the results are shown in Table 5.

Table 5: Mean, standard deviation, the mean Difference and *T* test for one sample, for chat application and work-from-home applications dimensions

Hypotheses	Item	Mean	Std. Dev	Mean Difference	<i>t</i>	Sig.
H_{1a}	x1	4.04	1.26	1.04	9.205	0.000
	x2	3.93	1.19	0.93	8.674	0.000
	x3	3.81	1.26	0.81	7.208	0.000
	x4	4.10	1.24	1.10	9.857	0.000
	x1 – x4	3.96	1.072	0.96	10.07	0.000
	x5	3.895	1.419	0.895	7.025	0.000
H_{1b}	x6	3.790	1.478	0.790	5.956	0.000
	x7	3.427	1.520	0.427	3.130	0.002
	x8	3.114	1.675	0.114	0.754	0.453
	x9	3.605	1.436	0.605	4.690	0.000
	x10	3.573	1.472	0.573	4.333	0.000
	x11	3.605	1.470	0.605	4.583	0.000
	x5 – x11	3.574	1.194	0.574	5.352	0.000

Results in Table 5 show that there is an evidence of statistically significant differences between the sample average and the hypothetical average approved in the study. In addition, all the differences were positively confirmed and this was confirmed by the results of the *t*-test. The mean difference between 0.81 as a minimum level for item (x3), which states that "Viewing and modifying the tasks performed by the employees for the organization, and item (x4), which states that "The dialogue with the working groups", as a maximum level, and the value of (*t*) at this level of difference (7.208, 9.857) which is a statistically significant value at a level less than 0.05. In general, the mean difference between the total and the hypothetical average for dimension was 0.96, and the value of (*t*) at this level of difference is 10.07 which is statistically significant at a level less than 0.05. It may be probably evident that the increase in the parts of the chat application is due to the simplicity and outbreak of using such applications. Therefore, H_{1a} is accepted.

Results related to the second sub-hypothesis (H_{1b}) which states that: "The mastery of job seekers for work-from-home applications (virtual classroom

applications and remote assistance applications), provides telecommuting job opportunities in the study sample." As shown in Table 5, it has been shown from the results of Table 5 that there is an evidence of statistical significance differences between the sample average and the hypothetical average. All the differences were positively confirmed and this is confirmed by the results of the *t*-test, where the mean difference between 0.427 as a minimum level for item (x7) which states: "Hold meetings with other branches of the organization" and part (x5), which related to "training" as a maximum level. The value of (*t*) at this level of difference (3.130, 7.025) was a statistically significant value at a level less than 0.05, with the exception of item (x8) concerning "Conducting Seminars and Discussions" In general, the mean difference between the total and the hypothetical average of dimension was 0.574, and the value of (*t*) at this level of difference 5.352 which is statistically significant at a level less than 0.05. This result is due to the organizations' awareness of the importance of using these applications in saving time, effort and money for organizations, and making it easier for

them to benefit from diverse experiences without having to leave the organization's site. Therefore, the above mentioned discussion leads for the acceptance of H_{1b} .

Results related to the third sub-hypothesis (H_{1c}) which states that: "The mastery of job seekers for computer programs (office software), provides telecommuting job opportunities in the study sample. The results as shown in Table 6.

Table 6: Mean, standard deviation, the mean Difference and T test for one sample, for office software and accounting and statistics programs dimensions

Hypothesis	Item	Mean	Std. Deviation	Mean Difference	t	Significance Level
H_{1c}	x12	4.24	0.83	1.24	16.661	0.000
	x13	3.99	0.83	0.99	13.288	0.000
	x14	3.69	0.90	0.69	8.435	0.000
	x15	3.69	0.91	0.69	8.466	0.000
	x16	4.06	0.78	1.06	15.132	0.000
	x17	4.00	0.86	1.00	12.876	0.000
	x18	3.98	0.83	0.98	13.077	0.000
	X12 -x18	3.95	0.58	0.95	18.245	0.000
	x19	3.21	1.61	0.21	1.451	0.149
	x20	3.24	1.60	0.24	1.684	0.095
H_{1d}	x21	3.35	1.61	0.35	2.456	0.015
	x22	3.31	1.63	0.31	2.095	0.038
	x23	3.51	3.92	0.51	1.442	0.152
	x24	2.56	1.62	-0.44	-3.04	0.003
	x25	2.52	1.58	-0.48	-3.377	0.001
	x26	2.58	1.59	-0.42	-2.941	0.004
	x27	2.50	1.59	-0.50	-3.501	0.001
	X19 - X27	2.98	1.27	-0.02	-0.204	0.839

Result displayed in Table 6 show that there is an evidence of statistically significant differences between the sample averages and the hypothetical average. All the differences were positively approved and this is confirmed by the results of the t-test, where the mean difference between 0.69 as a minimum level for part (x14, x15), related to "using desktop publishing programs to document the activities of the Organization" and "using desktop publishing programs to prepare booklets and brochures for the organization " and item x12 related to "writing and text formatting using the MS word))" at a maximum. Furthermore, the value of (t) at this level of difference (16, 661, 8, 466, 8, 435) which is statistically significant at a level less than 0.05. In general, the mean difference between the total and the hypothetical average was 0.95, and the value of (t) at this level of difference is (18, 245) which is statistically significant at a level less than 0.05. This indicates that desktop programs are widely used in all companies and organizations. Most of the work related to office work programs can be implemented remotely, especially as they are easy to implement and easy to send and receive from and to the organization. Therefore, H_{1c} accepted.

Results related to the fourth sub-hypothesis which states that "The mastery of job seekers for accounting and statistics programs provides telecommuting job opportunities in the study sample" are shown in Table 6. Data indicates that there are positive differences of statistical significance ($\alpha \leq 0.05$) between the sample averages and the hypothetical average of items x21, x2, as the mean differences were (0.35, 0.31) respectively and the value of (t) at this level of difference (2.456, 2.095) which is statistically significant at a level less than 0.05. The researchers attributed these figures to the fact that item x21 related to the use of Excel program in the preparation of financial budgets and

final accounts, and item x22 concerning the conduct of various accounts are essential for most organizations and their implementation do not require the presence of a permanent staff member within the organization. However, the results showed that there were statistically significant negative differences for items (x24, x25, x26, x27), where the mean differences were (0.44, -0.48, -0.42, 0.50), and the values of (t) at this level of difference were (-3.04, -3.377, -2.941, -3.501). This result can be attributed to the fact that the SPSS program is more specialized and requires high skills, as well as availability of alternative programs that are easy to use. The results also showed no statistically significant differences, and the following items x19, x20, and x23 were statistically insignificant, where the level of significance for each were greater than 0.05. This finding can be traced back to the fact that the surveyed sectors handle their activities in simple ways away from technologies that generate advanced knowledge and data. In general, the difference between the total and the hypothetical average was -0.02, and the (t) value at this level was 0.204, which is statistically insignificant at level ($\alpha \leq 0.05$). In general, it can be said that the subject of financial accounts is a sensitive part of different organizations. Therefore, organizations seem to prefer to have a permanent employee (accountant) as the financial accounts require a continuous work that only ends with closing the organization Accordingly, H_{1d} is rejected.

Table 7 shows results related to the fifth sub-hypothesis (H_{1e}) which states that "The mastery of job seekers for social networking applications (social networks) provides telecommuting job opportunities in the study sample".

The results in Table 7 show an evidence of statistically significant differences between the sample average and the hypothetical average

approved in the study. There is an indication that all the differences were positive.

Table 7: Mean, standard deviation, the mean difference and T test for one sample, for social networks dimension

Item	Mean	Std. Deviation	Mean Difference	T	Significance Level
x28	3.77	0.94	0.77	9.095	0.000
x29	3.65	0.88	0.65	8.201	0.000
x30	3.45	0.86	0.45	5.856	0.000
x31	3.62	0.90	0.62	7.700	0.000
x32	3.59	0.95	0.59	6.931	0.000
x33	3.62	0.94	0.62	7.339	0.000
x34	3.65	0.86	0.65	8.381	0.000
x35	3.93	2.62	0.93	3.937	0.000
x36	3.56	0.91	0.56	6.887	0.000
x37	3.56	0.93	0.56	6.756	0.000
x38	3.83	0.98	0.83	9.466	0.000
x39	3.82	0.95	0.82	9.595	0.000
x40	4.02	2.04	1.02	5.557	0.000
x41	3.50	0.78	0.50	7.142	0.000
x42	3.44	0.76	0.44	6.406	0.000
x43	3.42	0.81	0.42	5.783	0.000
x44	3.39	0.84	0.39	5.113	0.000
x45	3.38	0.80	0.38	5.260	0.000
X28 – x45	3.62	0.71	0.62	9.758	0.000

This is confirmed by the results of the t-test where the average difference varies between 0.38 as a minimum for item (x45), which is related to "use of YouTube in religious sermons", and item x40, which is related to "the promotion and advertising of products and services organization" as a maximum. The value of (t) at this level of difference (5.260, 5.557) was a statistically significant value at this level less than 0.05. In general, the difference between the total and the hypothetical average was 0.62, and the value of (t) at this level was 9.758, which is statistically insignificant at level ($\alpha \leq 0.05$).

This indicates that business organizations benefit from social networking applications in the marketing and advertising their various activities and products. In addition, they use them to develop their business and reach the largest segment of society without the need for a permanent employee in the organization. Accordingly, H1e is accepted.

Table 8 displays the results related to the sixth sub-hypothesis H1f which states that "The mastery of job seekers for designing programs provides telecommuting job opportunities in the study sample".

Table 8: Mean standard deviation, the mean difference and T test for one sample, for designing programs and engineering planning programs dimensions.

Hypothesis	Item	Mean	Std. Deviation	Mean Difference	t	Significance Level
Sixth sub-hypothesis	x46	3.96	0.87	0.96	12.303	0.000
	x47	3.90	0.90	0.90	11.075	0.000
	x48	3.92	0.88	0.92	11.637	0.000
	x49	3.95	0.87	0.95	12.140	0.000
	x50	4.18	2.74	1.18	4.778	0.000
	x51	3.28	1.63	0.28	1.933	0.056
	x52	3.12	1.62	0.12	0.834	0.406
	x53	2.82	1.60	-0.18	-1.232	0.220
	x54	2.67	1.56	-0.33	-2.360	0.020
	x55	2.56	1.61	-0.44	-3.004	0.003
	X56	2.75	1.74	-0.25	-1.598	0.113
	X57	2.70	1.67	-0.30	-1.987	0.049
	X58	2.70	1.68	-0.30	-1.981	0.050
	(x46-58)	3.40	0.89	0.40	5.034	0.000
	X59	2.17	1.49	-0.83	-6.226	0.000
	X60	2.09	1.44	-0.91	-7.061	0.000
Seventh sub-hypothesis	X61	2.15	1.46	-0.85	-6.530	0.000
	X62	2.14	1.44	-0.86	-6.652	0.000
	X59-x62	2.14	1.38	-0.86	-6.986	0.000

Statistical data shown in Table 8 show that there is an evidence of statistically significant differences at level ($\alpha < 0.05$) between the sample average and the hypothetical average of items x46, x47, x48, x49, x5, where the average differences were (0.96, 0.90, 0.92, 0.95, 1.18) respectively. The value of (t) at this level of difference (12.303, 11.075, 11.637, 12.140, 4.778) which is a statistically significant value at a level less than 0.05. The researchers attributed this to the fact that the Photoshop application is one of the most used design programs because of its

enormous potential. In addition, most organizations need promotional designs and invitation cards for their various activities. The results showed that there were statistically significant negative differences in items x54, x55, where the mean differences were (0.33-, 0.44-), the values of (t) at this level of difference were (-2.360-, 3.004). The researchers attributed this to the lack of e-card use by organizations (as stated in item x54). Regarding item x55, which states that "the use of flash software in web design, one reason may be that respondents

are not familiar with the flash application as well availability of alternative programs that do the same functions, results showed that there were no statistically significant differences for items x52, x53, and x58, where the level of significance was greater than 0.05. It can be said that these items apply to the same interpretation. In general, the difference between the total and the hypothetical average was -0.40, and the (t) values at this level of difference were .5034, which is statistically insignificant at level ($\alpha \leq 0.05$). Accordingly, H_{1f} is accepted.

As shown in Table 8, results related to the seventh sub-hypothesis (H_{1g}) which states that "The mastery of job seekers for engineering planning programs provides telecommuting job opportunities in the study sample", there is an evidence of statistically significant differences ($\alpha < 0.05$) between the sample average and the hypothetical average. These differences were negative for all items, and in favor of the hypothetical average. The average difference varies between (0.91-) as a minimum for item x60 which is related to "Electrical planning and (0.83) as a maximum of item x59 related to "urban

planning", and the (t) values at this level were (-6.226, -7.061), which is statistically insignificant at level ($\alpha \leq 0.05$). In general, the average difference for the total score of the dimension was (0.86-) and the value of (t) at this level of difference -6.986., which is statistically significant ($\alpha < 0.05$). The researchers attributed this result to the fact that the application of "AutoCAD" is a specialized application used by the engineers to create designs in the fields of civil, architectural, electrical engineering taking into consideration that most of the respondents are from commercial, educational, charitable and medical organizations. Hence, H_{1g} is rejected.

To verify the second hypothesis which states that: "There are statistically significant differences ($\alpha < 0.05$) among the averages of the modern ICT applications in Saudi private sector organizations due to (age, academic qualification, years of work experience, profession, the nature of company or organization activities as well as the number of staff in the organization", one-way ANOVA analysis was used and the results are as shown in Table 9.

Table 9: Results of one-way ANOVA analysis test

Variable		Sum of Squares	Df	Mean Square	F	Sig.
Age	Between Groups	2.041	3	0.68	1.963	0.123
	Within Groups	41.582	120	0.347		
	Total	43.623	123			
Educational Qualification	Between Groups	0.15	3	0.05	0.138	0.937
	Within Groups	43.473	120	0.362		
	Total	43.623	123			
Years' Work Experience	Between Groups	3.72	2	1.86	5.64	0.005
	Within Groups	39.903	121	0.33		
	Total	43.623	123			
Job grade	Between Groups	0.167	2	0.083	0.232	0.793
	Within Groups	43.457	121	0.359		
	Total	43.623	123			
The company's activity	Between Groups	1.159	3	0.386	1.092	0.355
	Within Groups	42.465	120	0.354		
	Total	43.623	123			
Organization years' experience	Between Groups	5.745	2	2.872	9.176	0
	Within Groups	37.879	121	0.313		
	Total	43.623	123			
Number of employees in Organization	Between Groups	1.825	3	0.608	1.746	0.161
	Within Groups	41.799	120	0.348		
	Total	43.623	123			

The statistical data which has been shown in Table 9 could be illustrated as follows:

1. There are no statistically significant differences among the averages of modern ICT applications in Saudi private sector organizations due to demographic variables (e.g., age, qualifications, job grade, nature of the company/organization activities, and the number of workers in the organization). This is confirmed by the values of (F), which are (1.963, 0.138, 0.232, 1.092, 1.746) respectively. Such values are below their tabular value at a significant level ($\alpha < 0.05$).
2. There are statistically significant differences among the averages of modern ICT applications in Saudi private sector organizations due to the following demographic variables (years of work experience, years of experience of the organization in the activity). This is shown through the values of

(F) which are (5.640, 9.176) respectively. Such values are greater than their tabular value at a significant level ($\alpha < 0.05$).

To determine the sources of variance according to the years of work experience and the years of organization experience in the activity when the (F) value is statistically significant, the Post Hoc tests were used. The Tukey test was used to track the significance of the differences. Table 10 and Table 11 show the results of the Tukey test.

Table 10: Results of the Tukey test for years of work experience variable dimension

Years' Work Experience	N	Subset for alpha = 0.05	
		1	2
From 10 Years and Over	47	3.2822	
From 5 to Less than 10 Years	47	3.3500	
Less than 5 years	30		3.7146

The results of the Tukey test showed statistically significant differences at a level less than 0.05 among the averages of modern ICT applications in Saudi private sector organizations between those whose years of experience are 10 years and over 5 to less than 10 years, and those with less than 5 years of experience. The researchers attributed this to the fact that the little experienced people are new graduates who are more acquainted with modern techniques when compared to the old experienced people.

Table 11: The results of the Tukey test for years of the organization's experience in the activity variable dimension

Organization years' experience	N	Subset for alpha = 0.05	
		1	2
From 5 to Less than 10 Years	31	3.1426	
10 Years and Over	70	3.4042	
Less than 5 years	23		3.8015

The results of the Tukey test showed statistically significant differences at a level less than 0.05 among the averages of modern ICT applications in Saudi private sector organizations between organizations with years of experience in the activity from 5 to less than 10 years, and 10 years and more on the one hand, and organizations with years of experience in activity less than 5 years on the other hand, and for organizations with years of experience in activity less than 5 years. The benefit comes for organizations whose years of experience are less than 5 years in activity.

Based on the above figures, the hypothesis which states that: "There are statistically significant differences ($\alpha < 0.05$) among the averages of the modern ICT applications in Saudi private sector organizations is partially accepted with regard to the years of work experience and years of experience of the organization in the activity. The hypothesis was partially rejected in relation to age, qualifications, degree of employment, nature of the company or organization, and number of employees in the organization.

5. Conclusions, recommendations and implications

This study examined the association of modern ICT applications and telecommunications in providing telework jobs opportunities in private sector incorporating in Southern Riyadh provinces. The final sample of this consists of 124 CEOs, managers and deputy managers from 80 companies. A questionnaire was distributed to obtain the data in 2017. The study came to the following findings: (1) The mastery of job seekers for ICT applications (combined) provides telecommuting job opportunities in the study sample with an average of (3.14); (2) The mastery of job seekers for (chat applications) provides telecommuting job opportunities in the study sample with an average of 3.96; (3) The mastery of job seekers for work-from-

home applications (virtual classroom applications and remote assistance applications) provides telecommuting job opportunities in the study sample with an average of 3.57; (4) The mastery of job seekers for computer programs (office software) provides telecommuting job opportunities in the study sample, with an average of 3.95; (5) The mastery of job seekers for accounting and statistics programs does not lead to providing telecommuting job opportunities in the study sample, with an average of 2.98; (6) The mastery of job seekers for social networking applications (social networks) provides telecommuting job opportunities in the study sample, with an average of 3.62; (7) The mastery of job seekers for designing programs provides telecommuting job opportunities in the study sample, with an average of 3.40; (8) The mastery of job seekers for engineering planning programs does not lead to providing telecommuting job opportunities in the study sample, with an average of 2.14; and (9) The existence of such kind of differences is due to demographic characteristics and their relation in mastering the use of ICT applications.

This study recommends the following: (1) Incorporating the applications of ICT to reduce time, effort, and expenses and to raise efficient productivity through providing telecommuting job opportunities; (2) Increasing interest in specialized applications such as (SPSS) and engineering drawings (AutoCAD), (3) Designing training programs targeting workers in business organizations as well as groups of telecommuting job opportunities, and (4) Evaluating and discussing the results of the differences among the demographic characteristics and their relationship to master use of ICT applications in order to enhance the positive aspects and to avoid negative aspects.

In order to promote the expansion of the teleworking approach, the researchers suggest the following: (1) establishing IT units in organizations in order to cope with technological developments and to get benefit from them in the development of telecommuting job opportunities, (2) revisiting the regulations and legislations that might govern the way of working remotely, and (3) organizing conferences and seminars on the subject of teleworking by the chambers of commerce. Finally, the implications of the study can be usefully extended to other rejoins within the Kingdom of Saudi Arabia and the Arab Gulf countries.

Compliance with ethical standards

Conflict of interest

The authors declare that they have no conflict of interest.

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