



Teleworking Survey in Saudi Arabia: Reliability and Validity of Arabic Version of the Questionnaire

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Objectives: This study aimed to adapt the survey questionnaire designed by Moens et al. (2021) and determine the validity and reliability of the Arabic version of the survey in a sample of the Saudi population experiencing teleworking.

Methods: The questionnaire includes 2 sections. The first consists of 13 items measuring the impact of extended telework during the coronavirus disease 2019 (COVID-19) crisis. The second section includes 6 items measuring the impact of the COVID-19 crisis on self-view of telework and digital meetings. The survey instrument was translated based on the guidelines for the cultural adaptation of self-administrated measures.

Results: The reliability of the questionnaire responses was measured by Cronbach's alpha. The construct validity was checked through exploratory factor analysis followed by confirmatory factor analysis (CFA) to further assess the factor structure. CFA revealed that the model had excellent fit (root mean square error of approximation, 0.00; comparative fit index, 1.0; Tucker-Lewis index, 1; standardized root mean squared residual, 0.0).

Conclusions: The Arabic version of the teleworking questionnaire had high reliability and good validity in assessing experiences and perceptions toward teleworking. While the validated survey examined perceptions and experiences during COVID-19, its use can be extended to capture experiences and perceptions during different crises.

Key words: Validity, Reliability, Teleworking, Perception, Arabic language

INTRODUCTION

The coronavirus disease 2019 (COVID-19) pandemic introduced several challenges and negative consequences to health-care systems, economies, and social lives. In response to the pandemic and to control the spread of the infection, many countries enforced precautionary measures such as social dis-

tancing and lockdowns [1]. These measures prevented the continuation of life as normal in different aspects, including work life. Thus, governments and industries all over the world adopted teleworking to continue business operations despite enforced precautionary measures and to mitigate the economic or financial consequences of the pandemic [2,3]. As a matter of fact, across the globe, an increased uptake of teleworking was observed as a response to the COVID-19 pandemic [4-6].

Teleworking is an alternative work arrangement in which employees use information and communication technologies to perform their job duties in a location other than primary workplaces [7]. Teleworking has been adopted in times of crisis, disasters, and pandemics—such as COVID-19. Teleworking during a crisis holds different meanings to employees compared to “voluntary” teleworking and it is thus important to

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understand how employees experience and perceive teleworking in times of crisis, such as the COVID-19 pandemic.

Studies documenting experiences and views towards teleworking mainly use self-reported data through surveys. Validated employee-reported surveys are widely administered to examine experiences and perceptions towards teleworking. Since the beginning of the COVID-19 pandemic, various surveys have been developed to document perceptions towards COVID-19 and teleworking. These surveys had diverse foci and purposes, such as assessing organizational readiness, the effectiveness of teleworking, the advantages and disadvantages of teleworking, qualities required for teleworking, teleworking adaptation, and experiences and perceptions towards teleworking [5,6,8-11].

In a literature search, we found that Moens et al. [8] designed a survey questionnaire on the experiences of teleworkers as well as perceptions towards teleworking given the COVID-19 pandemic. This survey questionnaire was found to have evidence of reliability and validity in Flemish employees.

Saudi Arabia is among the countries that adopted teleworking fastest and hence was able to considerably sustain the socioeconomic conditions in the country. Nevertheless, as per our knowledge, no previous studies have documented experiences of teleworking in Arab countries. Nonetheless, the Arabic language is the official language of 30 countries and states, and is spoken by more than 400 million people, mainly in the Middle East and North Africa [12]. To the best of our knowledge, there are no translated versions of the survey in any language. Furthermore, there is currently no evidence supporting the use of the survey for Arabic-speaking populations. The aim of the study was to adapt the survey to Arabic and determine the validity and reliability of the Arabic version of the survey in a sample of the Saudi population experiencing teleworking.

METHODS

A descriptive, cross-sectional study was conducted to explore employees' experiences and perceptions towards teleworking during COVID-19 pandemic. Convenience snowball sampling was utilized across the main geographical regions of Saudi Arabia. An online questionnaire was created using QuestionPro and disseminated via different social media platforms (Twitter, Instagram, WhatsApp, LinkedIn, and Snapchat). The confidentiality of participants' personal information was guaranteed, and informed consent was required before participation in the

study. The data collection started during the partial curfew in the country, on June 8, 2020, and lasted for 2 weeks.

Participants

The questionnaire was administered in both Arabic and English. In total, 1417 responses were received. However, 522 individuals did not fill out the questionnaire completely. Therefore, 895 participants were included in our research. Only 415 out of the 895 chose to complete it in Arabic. Therefore, 415 participants made up our sample in this study. As shown in Supplemental Material 1, 59% of the participants were women and 41% were men. The majority of them were married (69.6%) and were between 31 years and 40 years old (41.9%). The distribution of participants from the public and private sectors were comparable, with 51% working in the public sector. Most of the participants worked in the educational sector (38.5%), while 10.4% worked in the health sector. In addition, in order to overcome selection bias, the researchers ensured that the majority of the study participants were aged between 25 years and 45 years old, reflecting the workforce of Saudi Arabia [13].

Study Tool

The teleworking questionnaire was developed by and used among Flemish employees. The survey consists of 2 main sections. The first section measures the impact of extended telework during the COVID-19 crisis on various life and career aspects and includes 13 items. These questions cover various aspects relating to work-life balance, career aspects, professional isolation, work performance, well-being, organizational attitude, and negative effects due to teleworking. The second section measures the impact of the COVID-19 crisis on self-view of telework and digital meetings and includes 6 items. The 6 items assess perceptions/self-view towards teleworking and the future impact of the COVID-19 pandemic on teleworking and digital meetings. A 5-point Likert scale was used in both sections, with responses ranging from "completely disagree" (1) to "completely agree" (5).

Translation and Cultural Adaptation Process

The researchers translated the survey based on the guidelines of cultural adaptation of self-administrated measures [14]. First, the questionnaire was translated from the original language (English T1) into Arabic by a native Arabic academic researcher (T2). Then, another expert revised the translation to validate it (T3). Next, a back translation from Arabic to English

was done by an expert who did not view the original version of the questionnaire (T4). Then, a group of 4 experts reviewed both T1 and T4 for any divergence in meaning or vocabulary.

The translated questionnaire was then piloted with 5 participants. The participants were asked to complete the questionnaire and comment on any used vocabulary if it was difficult to understand and suggest any modifications, if needed. An online meeting with the 5 participants was held to hear their feedback and comments on each question. Finally, the questionnaire was entered into QuestionPro and an expert researcher proofread the questionnaire before administering it to the study participants.

Statistical Analysis

The reliability of the questionnaire responses was measured using Cronbach's alpha. The item-total correlation was computed to determine the correlation of each item total with the scale score. The leave-one-out method measured the reliability

coefficient if any item was deleted from the scale. A Cronbach's alpha value of more than 0.7 was considered to indicate good reliability of the responses.

To check the construct validity, first exploratory factor analysis was conducted. Items with a loading of more than 0.4 were kept in the matrix. Confirmatory factor analysis was then run to further assess the factor structure. Goodness-of-fit testing was also performed to validate the model. A model was considered as having a good fit if we obtained values of root mean square error of approximation (RMSEA) less than 0.08, standardized root mean squared residual (SRMR) less than 0.10 and comparative fit index (CFI) and Tucker-Lewis index (TLI) more than 0.90.

Ethics Statement

The study was approved by the University Institutional Review Board Committee at Imam Abdulrahman Bin Faisal University (IAU) in Dammam (IRB No. 2020-03-343).

Table 1. Reliability measures of life and career aspects with the original coding of the responses to all items (using the original English-language wording)

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Q20 - I am globally satisfied that I am working more at home because of the corona crisis	34.86	49.636	0.428	0.709
Q20 - I have more conflicts with my family because I work more at home because of the corona crisis	37.11	55.791	0.037	0.750
Q20 - I have more professional conflicts (e.g. with supervisor or colleagues) because I work more at home because of the corona crisis	37.13	56.727	-0.018	0.754
Q20 - I am often disturbed by family members during extended homework because of the corona crisis	36.47	56.690	-0.036	0.762
Q20 - I find it difficult to combine different means of communication (such as phone, e-mail and Skype) during extended homework due to the corona crisis	36.90	58.643	-0.138	0.772
Q20 - I feel well guided by my employer (or supervisor) during the extended homeworking due to the corona crisis	35.38	50.298	0.368	0.716
Q20 - I can do my job more efficiently during the extended homework because of the corona crisis	35.78	45.633	0.617	0.683
Q20 - I feel more connected to my employer due to the extended homework because of the corona crisis	35.89	47.160	0.533	0.695
Q20 - I am experiencing a better work-life balance due to the extended homework because of the corona crisis	35.57	45.594	0.627	0.682
Q20 - I feel a stronger bond with my colleagues due to the extended homework because of the corona crisis	36.19	47.008	0.564	0.692
Q20 - I experience less work-related stress due to the extended homework because of the corona crisis	35.58	46.843	0.515	0.696
Q20 - I think the extended homework caused by the corona crisis is reducing my chances of burnout in the near future	35.49	46.347	0.575	0.689
Q20 - I experience better concentration at work due to the extended homework because of the corona crisis	35.69	45.264	0.601	0.684

RESULTS

Perceived Impact of Extended Telework During the COVID-19 Crisis on Various Life and Career Aspects

The overall reliability of the scale was 73.3%. The 4 negative items (2, 3, 4, and 5) showed weak correlations with the overall scale score. If items 5, 4, 3, and 2 were deleted from the scale, the overall reliability coefficient value would increase to 77.2%, 76.2%, 75.4%, and 75.0%, respectively (Table 1).

Looking at these items, we realized that these items were negative. Therefore, we reversed their coding to 1: completely agree, 2: agree, 3: neutral, 4: disagree, and 5: completely disagree. This modification in the coding increased the reliability coefficient by 85.3%. Moreover, all items contributed well to the consistency of the responses (Table 2).

Construct validity

The Kaiser-Meyer-Olkin measure (0.864) and significant *p*-value from the Bartlett test demonstrated the adequacy of the

data to perform factor analysis. A 3-factor solution was produced using principal axis factoring with varimax rotation. The factor loadings of all the items were more than 0.4, indicating that all variables presented a good correlation with the corresponding factor Supplemental Material 2.

In confirmatory factor analysis, the *p*-value from the chi-square test was significant, indicating that the model was not well-fitted. However, the RMSEA (0.072), CFI (0.947), TLI (0.918), and SRMR (0.044, which was less than 0.10) indicated good model fit (Figure 1). The unstandardized and standardized loadings, epsilon values, and covariance and correlation values are given in Supplemental Material 3 (A-C).

We further assessed convergent and discriminant validity of the factor model. Average variance extracted (AVE) was first computed using the appropriate formula and dividing the sum of square standardized loading by the number of items in each factor (Table 3). Using the threshold of an AVE of ≥ 0.5 , it was noted that factor 2 had an AVE greater than 0.5, indicating that the items were related to each other within factor 2. Fac-

Table 2. Reliability measures of life and career aspects with reverse coding of responses to the negative items (using the original English-language wording)

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Q20 - I am globally satisfied that I am working more at home because of the corona crisis	42.07	75.747	0.536	0.841
Q20 - I have more conflicts with my family because I work more at home because of the corona crisis	42.11	80.387	0.298	0.854
Q20 - I have more professional conflicts (e.g. with supervisor or colleagues) because I work more at home because of the corona crisis	42.08	80.850	0.283	0.855
Q20 - I am often disturbed by family members during extended homework because of the corona crisis	42.74	78.686	0.322	0.854
Q20 - I find it difficult to combine different means of communication (such as phone, e-mail and Skype) during extended homework due to the corona crisis	42.31	77.191	0.409	0.849
Q20 - I feel well guided by my employer (or supervisor) during the extended homeworking due to the corona crisis	42.59	77.176	0.441	0.846
Q20 - I can do my job more efficiently during the extended homework because of the corona crisis	42.99	72.517	0.625	0.834
Q20 - I feel more connected to my employer due to the extended homework because of the corona crisis	43.10	75.473	0.490	0.843
Q20 - I am experiencing a better work-life balance due to the extended homework because of the corona crisis	42.78	70.899	0.718	0.828
Q20 - I feel a stronger bond with my colleagues due to the extended homework because of the corona crisis	43.40	75.578	0.502	0.843
Q20 - I experience less work-related stress due to the extended homework because of the corona crisis	42.79	72.548	0.599	0.836
Q20 - I think the extended homework caused by the corona crisis is reducing my chances of burnout in the near future	42.70	71.518	0.682	0.830
Q20 - I experience better concentration at work due to the extended homework because of the corona crisis	42.90	70.364	0.694	0.829

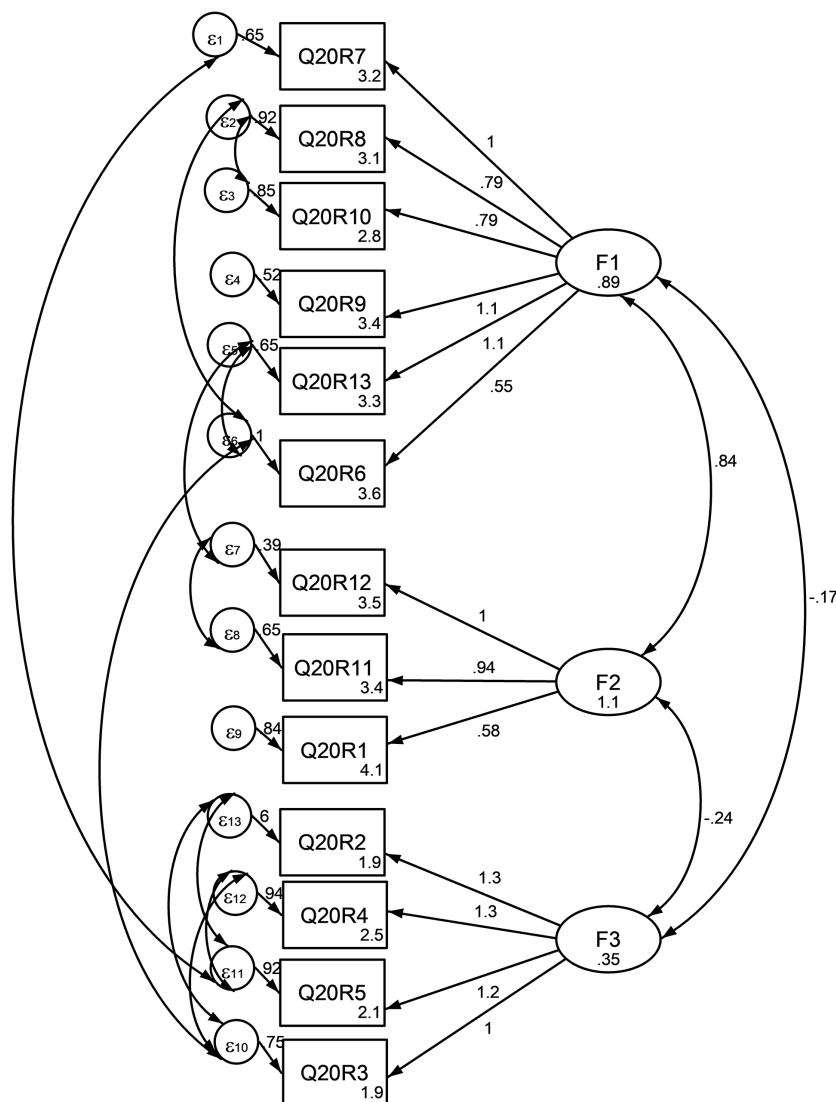


Figure 1. Confirmatory factor analysis of life and career aspects with 3 factors.

tor 1 had an AVE close to 0.5, while factor 3 had an AVE of 0.388.

Discriminant validity was assessed based on whether the square roots of the AVE values were higher than the correlation between factors. The AVE of factor 1 was less than the correlation between factor 1 and factor 2 but more than that between factor 1 and factor 3. Therefore, discriminant validity existed between factor 1 and factor 3 but not between factor 1 and factor 2. Similarly, the AVE of factor 2 was 0.745, which implied that discriminant validity existed between factor 1 and factor 3. The AVE of factor 3 was 0.623, which implied that discriminant validity existed both between factor 1 and factor 3 and between factor 2 and factor 3 (Table 3).

Perceived Impact of the COVID-19 Crisis on Self-view of Telework and Digital Meetings

Comprising 6 items only, this scale showed excellent consistency (Cronbach’s alpha=0.909). All 6 items showed high correlations with the scale score. Deleting any item would decrease the reliability coefficient (Table 4).

Construct validity

The Kaiser-Meyer-Olkin measure was 0.841, indicating that sampling was adequate to perform factor analysis. The Bartlett test of sphericity showed a significant correlation among the variables suitable for factor analysis ($p < 0.001$). A 1-factor solution was produced using principal axis factoring. Confirmatory factor analysis revealed that the model given in Supplemental

Table 3. Convergent validity and discriminant validity of the 3 factors

Convergent validity		Discriminant validity			
Latent Variable	AVE	Conclusion	Factor 1	Factor 2	Factor 3
Factor 1	0.471	No convergent validity	0.686	-	-
Factor 2	0.554	Convergent validity	0.833	0.745	-
Factor 3	0.388	No convergent validity	-0.307	-0.3779	0.623

Values in diagonals are squared AVE. Off-diagonals are the correlation coefficients between pairs of the two factors. AVE, average variance extracted.

Table 4. Reliability measures for the self-view component (using the original English-language wording)

Items	Scale mean if item deleted	Scale variance if item deleted	Corrected item-total correlation	Cronbach's alpha if item deleted
Q22 - Because of the current corona crisis, I now look more positively on teleworking	19.80	19.890	0.709	0.898
Q22 - Because of the current corona crisis, I hope to be able to do more telework in the future	19.94	18.970	0.750	0.893
Q22 - Because of the current corona crisis, much more telework will be done in our country in the future	19.71	20.184	0.715	0.897
Q22 - Because of the current corona crisis, I now look more positively on digital meetings	19.66	19.829	0.767	0.890
Q22 - Because of the current corona crisis, I hope that in the future more of my professional meetings will be held digitally	19.71	19.457	0.798	0.885
Q22 - Because of the current corona crisis, many more digital meetings will be held in our country in the future	19.58	20.259	0.752	0.892

Material 4 had excellent fit (RMSEA, 0.00; CFI, 1.0; TLI, 1; SRMR, 0.0).

DISCUSSION

The aim of the study was to adapt the teleworking questionnaire developed by Moens et al. [8] to Arabic and to determine the validity and reliability of the Arabic version of the questionnaire in a sample of the Saudi population. The results of the study indicated that the Arabic version of the teleworking questionnaire had high reliability and good validity in assessing experiences and perceptions toward teleworking. No published studies have utilized the same survey tool as this study. However, previous studies using different teleworking survey tools have reported Cronbach's alpha values ranging from 0.65 to 0.84 [15,16].

The sample of this study was diverse in terms of demographic variables. Of the study population, the majority were women, married, aged between 31 years and 40 years old, and held a bachelor's degree or higher. Our sample showed an almost equal representation of the private and public sectors. The sample was very similar to the Saudi labor market except in terms

of gender participation in the labor market and sector employment. In the third quarter of 2020, women participation in the Saudi labor market was limited to 30%, and about 83% were employed in the private sector [13].

Since Arabic is the official language in many countries, creating an Arabic version of the instrument studying perception and experiences of teleworking was necessary. Our findings are comparable to any pertinent study based on the translation and validation of a questionnaire in a local context. Moens et al. [8] carefully designed the questionnaire on the topic under consideration. We adopted 2 constructs of teleworking: (1) the perceived impact of teleworking during COVID-19 crisis on various life and career aspects and (2) the perceived impact of the COVID-19 crisis on self-view of telework and digital meetings. For the first constructs, we observed interesting findings while dealing with negative items. The reliability was good when the same Likert score was used as given in the original paper [8]. However, the reliability coefficient increased notably when the items' scores were reversed. Reverse coding of negative items in a set of positive items is cautiously recommended in the literature [17]. The factor analysis also clustered these 4 negative items in 1 factor. The psychometric properties of both

constructs were good. However, these findings are not comparable to any study on teleworking, as we could not find psychometric measures for instruments on this topic. However, these psychometric measures were compared with other questionnaire studying similar topics. For instance, Ta'an et al. [18] also reported a Cronbach's alpha value of more than 0.8 in the scales and subscales of their Arabic-translated questionnaire on workplace effectiveness. We also found excellent reliability of both constructs. The psychometric measures in their 6-factor model are comparable to those of our study in both constructs. The high CFI and TFI values and low RMSEA and SRMR values confirmed the validity of the items in the constructs. The convergent and discriminant validity of our first construct indicated that the negative items had low validity.

To the best of our knowledge, this is the only study to report a validated tool in Arabic to measure experiences and perceptions of teleworkers during a crisis. The availability of this validated tool is significant given that Arabic is the official language of 30 countries and states. Teleworking has been recognized as an alternative working mode during a crisis. While the validated survey examined perceptions and experiences during COVID-19, its use can be extended to capture experiences and perceptions during other crises that prevent the traditional working mode.

The study participants were limited to Saudi Arabia, which is one of the largest Arabic-speaking countries. Since this study had to be conducted in a short span of time to capture work experiences during the peak COVID-19 era. Later, the teleworking policies were relaxed, so we could not conduct test-retest reliability. Further studies would be necessary to cross-culturally validate the tool in other Arabic-speaking countries.

SUPPLEMENTAL MATERIALS

Supplemental materials are available at <https://doi.org/10.3961/jpmph.22.242>.

CONFLICT OF INTEREST

The authors have no conflicts of interest associated with the material presented in this paper.

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AUTHOR CONTRIBUTIONS

Conceptualization: AlNujaidi HY, Mehwish Hussain M. Data curation: AlNujaidi HY, Hussain M. Formal analysis: AlNujaidi HY, Hussain M. Funding acquisition: None. Writing – original draft: AlMubarak SH, AlFayez AS. Writing – review & editing: AlNujaidi HY, Hussain M, AlMubarak SH, AlFayez AS, AlSalman DM, AlSaif AK, Al-Juwair MM.

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