The Coronavirus Shopping Anxiety Scale: initial validation and development

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Abstract

Purpose – The purpose of this study is to develop a scale to measure coronavirus shopping anxiety. Numerous studies have developed a scale for measuring coronavirus anxiety and fear, notably absent is a concerted effort to review and assess the impact of coronavirus on the shopping anxiety of consumers. This scale fulfills this gap.

Design/methodology/approach – The steps taken for checking the various psychometrics of the scale include item generation, followed by exploratory factor analysis (EFA) through SPSS and confirmatory factor analysis through AMOS. The data were collected from over 208 respondents.

Findings – This study resulted in the development of a nine-item scale with robust psychometric properties. The scale resulted in highlighting two factors related to anxiety: in-store shopping anxiety and online shopping anxiety.

Research limitations/implications – The scale developed has the desirable reliable and valid properties that could be used by aspiring researchers.

Practical implications – The scale developed highlighted that the restrictions in shopping impact the mental health and psychology of consumers. The scale resulted in analyzing the factors related to shopping anxiety, which could give top management a perspective and vision to look into the minds of the consumer's shopping anxiety behaviors.

Social implications – Companies, firms, health professionals and marketers could use this scale to investigate the various shopping anxiety perceptions among consumers in society.

Originality/value – This research fills the gap by developing a first nine-item scale based on the qualitative research and quantitative assessment for measuring shopping anxiety caused due to the pandemic.

Keywords Anxiety, Scale development, Coronavirus, Pandemic, Coronavirus shopping anxiety, Shopping anxiety

Paper type Research paper

Introduction

The pandemic has extraordinarily impacted the consumer's psychology and shopping behavior. The literature on changes in the consumer's shopping behavior during the pandemic has been widely discussed in the literature. Recent studies have explored and highlighted the emergence of online shopping (Artanti *et al.*, 2021; Fihartini *et al.*, 2021; Koch *et al.*, 2020; Moon *et al.*, 2021; Pham *et al.*, 2020; Sanaullah *et al.*, 2020), the emergence of trust on social media (Artanti *et al.*, 2021; Taha *et al.*, 2021) and changes in the purchasing and shopping habits of consumers (Ogundijo *et al.*, 2021; Lehberger *et al.*, 2021; Palmer *et al.*, 2021) caused due to the pandemic. However, with this growth of new changes in the shopping behavior arise new challenges and problems compared to the traditional way of shopping.

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These new changes in shopping behavior are impacting the mental health and psychology of the consumer. The world is still surrounded by the threat of new variants, and the challenge aroused today is of the consumer's shopping anxiety caused due to this pandemic. Anxiety arises in such situations where a consumer is uncertain about potentially harmful outcomes of a future event, lacks self-efficacy in altering the course of events and, thus, perceives a high threat (Chiou and Wan, 2006). Hence, anxiety is impacting the consumer's shopping behavior, and researchers must have a reliable measurement of anxiety related to a consumer's shopping behavior.

There are numerous studies, conceptual frameworks and scales well documented in the literature for measuring the coronavirus anxiety level of an individual and analyzing its impact on the individual mental health and psychology. The current situation of coronavirus pandemic across the world and the new variants surging has increased the importance of studying the shopping anxiety among the consumers and public at large. The restrictions in shopping impact the mental health and psychology of consumers. No published research has investigated, in a comprehensive manner, the anxiety level related to consumer shopping. This research aims to fulfill this gap by developing a scale related to coronavirus shopping anxiety. So, the objective of this study is to develop and purify a scale to measure coronavirus shopping anxiety. This research contributes by developing a scale for measuring consumer coronavirus shopping anxiety through a series of steps of scale refinement and purification process. This research will contribute by depicting how the companies should design more innovative ways for protecting the consumers from the virus, and the ways could be depicted by the items of the scale constructed in this study. This will also contribute to understanding why consumers experience and feel anxiety during shopping after experiencing a pandemic. This research will further enlighten marketers and researchers to understand consumers' mental stress and complexity in an unexpected situation. This has prepared the marketers to handle the consumer anxiety related to online and in-person shopping and equipped with the contingency plan for satisfying and delighting their customers. This research will also highlight that people at all levels in the organization have to work together to implement their marketing strategy in an unprecedented situation. The paper reports findings from a two-stage study that (1) began with exploratory intent, guided by the research question: "what was the impact of the pandemic on consumer's shopping?" which led to the development and construction of new items of the Coronavirus Shopping Anxiety Scale. (2) The psychometrics of the scale was tested by collecting data from a nationwide sample of consumers that supported the exploratory study derived findings. The research resulted in developing a two-factor scale for measuring consumer shopping anxiety. The scale highlights the inclusion of both in-store and online shopping anxiety among the consumers impacted by the pandemic.

Literature review

Consumer anxiety has been studied in a variety of contexts since its inception. Anxiety is perhaps most commonly used to denote a complex emotional reaction or state that varies in intensity and fluctuates over time as a function of the intrapsychic or situational stresses that impinge upon an individual (Spielberger, 1966). Additionally, anxiety is considered an unpleasant emotional state, characterized by tension, apprehension and worry, and occurs in response as a threat to a self-preservation goal (Arkin and Ruck, 2007). The term "anxiety" is also used to refer to individual differences in anxiety-proneness as a personality trait (Locander and Hermann, 1979). The evidence further indicates that the conditions that lead to dissonance arousal may also lead to an emotional state of anxiety (Oshikawa, 1972) as anxiety is considered to be an outcome of temporary circumstances (Hawkins, 1972), which subsequently impacts the consumer purchase behavior. Anxiety-related to COVID-19

characterizes stress, worry, intolerance of uncertainty and higher levels of threat perception (Micalizzi *et al.*, 2021; Mertens *et al.*, 2020). Research highlights that symptoms such as anxiety, depression, fear, stress and sleep problems are seen more frequently during the COVID-19 pandemic (Torales *et al.*, 2020). Research further states that this lifestyle transformation and threat of being infected causes depression and anxiety disorders (Chen *et al.*, 2020). Authors further add that anxiety related to COVID-19 influences consumers' shopping behavior. Shopping anxiety is related to a negative emotion that is lower in pleasure and has a negative relationship with satisfaction (Jones *et al.*, 2020). Shopping anxiety is further linked to the stress caused by customers' complexity and information overload and increases their time to navigate the service process (Gong and Choi, 2016). The service interface led to customers' frustration, anxiety and stress during the pandemic, irrespective of whether a service is high or low (Shell and Buell, 2019). A consumer encounters shopping anxiety when a consumer has situational stress, filled with apprehension, worry and uneasiness that results in buying or impulses to buy that are senseless and irresistible as the consumer has limited options. A consumer today is surrounded by these emotions, and the buying behavior of consumers at this stage is marked with hopelessness, grief, risk, distress and fear that consequently results in shopping anxiety.

Emotions play a key role in consumer behavior, and mixed emotions mediate the impact of certain product-related, market-related and personal factors on consumers' intention to purchase (Penz and Hogg, 2011). In the framework of the component process model, emotion is defined as an episode of interrelated, synchronized changes in the states of all or most of the five organismic subsystems in response to the evaluation of an external or internal stimulus event as relevant to major concerns of the organism (Scherer, 1987, 2001). At the heart of emotion, mood and any other emotionally charged event are states experienced as simply feeling good or bad, energized or enervated (Russell, 2003). Emotions are also considered to impact explaining consumers' behavior significantly. Research has identified three types of emotional stimuli affecting consumers: emotions produced by the item being purchased, feelings related to various aspects of the evaluation process and emotions stemming from factors unrelated to the purchase itself (Pelegrín-Borondo *et al.*, 2015). Another study highlights three components that have long-standing status as modalities of emotion – expression, bodily symptoms and arousal, and subjective experience (Scherer, 2005). Anxiety is considered a basic emotion and measured as a dimension of pleasure and arousal (Russell, 1980). The author elaborates that people are not typically aware of all the pieces of information that they rely on in analyzing their own emotional state. Anxiety is a primary emotion of expression that is subjective and impacts the consumer's behavior during the pandemic.

A consumer today is surrounded by an emotionally charged alien situation of threat and fear, that is causing anxiety while evaluating the stimulus around of pandemic. Thus, anxiety is also considered a form of emotion that is highly impacted by the situation around.

There are many scales constructed in the literature for measuring coronavirus anxiety. A five-item Coronavirus Anxiety Scale (CAS) was developed for measuring the mental health concerns of people impacted by the coronavirus pandemic (Lee, 2020). This CAS developed is a screening tool designed to identify quickly and accurately those suffering from dysfunctional anxiety of the coronavirus. The various anxiety symptoms reported in the scale were dizziness, sleep disturbances, tonic immobility, appetite loss and abdominal distress. This version of the five-item CAS developed by Lee (2020) to measure the mental health of an individual impacted by pandemic was validated and adapted across different countries, like India (Singh, 2021), Bangladesh (Ahmed *et al.*, 2020), Korea (Choi *et al.*, 2020), Cuba (Broche-Pérez *et al.*, 2020), Colombia (Vinaccia *et al.*, 2021), Brazil (Padovan-Neto *et al.*, 2021) Turkey (Evren *et al.*, 2020),

Peru (Franco-Jimenez, 2020), Mexico (Mora-Maganã *et al.*, 2020) and Arbia (Sayed *et al.*, 2020). Further, an 11-item Coronavirus Pandemic Anxiety Scale (CPAS-11) was developed to measure the symptoms of anxiety related to the COVID-19 pandemic to help identify individuals who might need mental health services (Bernardo *et al.*, 2020). Authors developed the Fear of COVID-19 Scale (FCV-19S) to identify the fear associated among the individuals related to COVID-19 (Ahorsu *et al.*, 2020).

Various studies have also used a combination of Lee (2020) five-item CAS and Ahorsu *et al.* (2020) FCV-19S for measuring the anxiety level of the individuals caused due to coronavirus. The coronavirus anxiety level among the Turkish population was analyzed with a combination of CAS and FCV-19S scales (Evren *et al.*, 2020). This combination was also validated for the Portuguese population and correlations with issues related to travel, tourism and hospitality were established (Magano *et al.*, 2021). This combination was also administered in order to assess the levels of anxiety and fear associated with COVID-19 among the Italian population (Orrù *et al.*, 2021).

However, there is a greater need to develop a CAS related to the consumer's shopping anxiety behavior and pattern. No published research has investigated, in a comprehensive manner, the anxiety level related to consumer shopping. This study aims to construct an anxiety scale based on the consumer's shopping behavior impacted by the coronavirus. So, the objective of this study is to develop and purify a scale to measure coronavirus shopping anxiety.

Methods

Many authors (Churchill, 1979; Forsythe *et al.*, 2006; El-Deeb and Hamed, 2019) state that a multi-item scale should be evaluated for accuracy and applicability, and emphasis should be on developing measures, which have desirable, reliable and valid properties. The procedure involved by Churchill (1979) suggests eight steps for scale development and validation process. The steps include – specify domain of construct (Step 1), generate a sample of items (Step 2), collect data (Step 3), purify measure (Step 4), collect data (Step 5), assess reliability (Steps 6), assess validity (Step 7) and develop norms (Step 8). According to the author, the list of some calculations that should be performed in developing better measures of the construct includes experience survey, insight stimulating examples, critical incidents, focus groups, coefficient alpha, factor analysis, reliability, validity, average, and other statistics summarizing the distribution of score. An 11-step process for the scale development and validation process is suggested by Forsythe *et al.* (2006). The steps include – conceptualization of constructs (Step 1), qualitative inquiry (Step 2), item generation (Step 3), scale purification (Step 4 and 5), scale stability (Step 6), scale validity (Steps 7–10) and practical utility (Step 11). A three-step process for the scale refinement as suggested by El-Deeb and Hamed (2019) includes item generation, factor analysis and finally the confirmatory analysis for the purification stage. The procedure followed in this study for scale refinement and development is based on the well-accepted paradigm followed by the authors stated above.

The first subsection explains how the various items of the scale are generated, and second, the data collection process and the sample characteristics are described, followed by scale refinement and purification process.

Generate sample of items for the scale used in the study

After an extensive review of literature on coronavirus anxiety, the items were generated from the related articles and existing scales. In this study, the *shopping anxiety scale* is measured through items adapted from works of various researchers (Spielberger *et al.*, 1971;

Menasco and Hawkins, 1978; Antony *et al.*, 1998; Chandu *et al.*, 2020). Anxiety is considered to consist of two principal components: state and trait anxiety (Spielberger *et al.*, 1971). State anxiety (a-state) is considered a transitory emotional state due to specific situations, and trait anxiety (a-trait) is conceptualized as a predisposition for which a wide range of situations are perceived as threatening, physically or psychologically. For this research, the items from state anxiety were adapted and edited as state anxiety is temporary, induced by situational circumstances. State anxiety is also examined as a measure of the magnitude of post-purchase dissonance (Menasco and Hawkins, 1978). The items were adapted and edited from this scale as the pandemic has impacted the shopping behavior of the consumers, and the post-purchase dissonance was found to have a predicted effect on a validated measure of state anxiety. The Depression Anxiety Stress Scales (DASS) and the 21-item short form of these measures (DASS-21) were examined for the nonclinical volunteers and patients with panic disorder (Anthony *et al.*, 1998). This study replicates previous findings indicating that the DASS distinguishes well between features of depression, physical arousal and psychological tension and agitation and extends these observations to the DASS-21. The items for this study were extracted from the DASS anxiety and DASS-21 anxiety scales. The CAS was constructed and demonstrated a two-component structure identified as "fear of social interaction;" "illness anxiety" (Chandu *et al.*, 2020). The items for this study were adapted from the illness anxiety component as they reflected the present study of coronavirus shopping anxiety.

Thus, a total of 20 items were generated at this stage. After reading various related articles, the content validity of the items was assessed by two focus groups. These items were administered to two focus groups comprising of three marketing faculty and an undergraduate class for the review. The items were modified, dropped and added based on the analysis of the focus groups, which highlighted a great impact of a pandemic on the shopping anxiety of consumers. The groups helped in screening and identifying the duplicate and irrelevant items. Based on the feedback of the focus groups, nine items were dropped, and three items were edited that appeared to fit the present construct in the light of the pandemic. In this study, an 11-item scale was generated for the shopping anxiety encountered by consumers during the pandemic. A five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree) was used to measure the items on the shopping anxiety scale. As a result, an 11-item scale is generated for measuring the Coronavirus Shopping Anxiety Scale.

Data collection and sample characteristics

The questionnaire was prepared in English on Qualtrics. It was a structured questionnaire based on a five-point Likert scale for evaluating the 11 items of the Coronavirus Shopping Anxiety Scale used in the study. A five-point Likert scale is used because it is easy and simple to understand. The respondents specified their level of agreement based on five points: (1) Strongly disagree; (2) Disagree; (3) Neither agree nor disagree; (4) Agree and (5) Strongly agree. As the data collection was done online, an ordered self-explanatory scale was used in the research. The data were collected using Amazon's Mechanical Turk panel among the US population. The USA was one of the most hit countries by COVID-19. The respondents of this country could truly highlight the shopping anxiety caused by the pandemic. The questionnaire was sent to the entire panel. The participants in the Amazon's Mechanical Turk panel were self-registered adults above 18 years of age, and the participation was voluntary. The US participants had volunteered and registered into Amazon's Mechanical Turk panel.

A total of 208 MTurk participants took the survey. Participants were given a brief overview of the study and were asked for their consent. Once participants agreed to the terms, they were then given instructions regarding the survey. Data were collected in July 2021.

A total of 208 completed questionnaires were used for the data analysis. A profile of sample can be seen in Table 1.

Scale refinement and purification

The scale refinement and purification included series of steps as suggested by many authors (Malhotra, 2005; Churchill, 1979; Gerbing and Anderson,1988; Hair *et al.*, 1998; Garg *et al.*, 2014; Liu and Keh, 2015; Peter, 1981; Netemeyer *et al.*, 1991; Forsythe *et al.*, 2006; El- Deeb and Hamed, 2019; Sachdeva, 2015). The authors state that a multi-item scale should be evaluated for accuracy and applicability and emphasis should be on developing measures, which have desirable, reliable and valid properties. At this stage to purify the measure and scale

Table 1.
Profile of the total sample for the study

	Frequency	%
Gender		
Male	110	52.9
Female	95	45.7
Prefer not to say	3	1.4
Total	*208*	*100.0*
Age (In years)		
18–24	30	14.4
25–34	93	44.7
35–44	42	20.2
45–54	23	11.1
55–64	14	6.7
65–74	4	1.9
75–84	1	0.5
85 - older	1	0.5
Total	*208*	*100.0*
Education		
Less than high school degree	2	1.0
High school graduate (high school diploma or equivalent including GED)	9	4.3
Some college but no degree	24	11.5
Associate degree in college (2 year)	18	8.7
Bachelor's degree in college (4 year)	109	52.4
Master's degree	39	18.8
Doctoral degree	4	1.9
Professional degree	3	1.4
Total	*208*	*100.0*
Household income		
Less than $10,000	16	7.7
$10,000–$19,999	11	5.3
$20,000–$29,999	29	13.9
$30,000–$39,999	21	10.1
$40,000–$49,999	17	8.2
$50,000–$59,999	25	12.0
$60,000–$69,999	13	6.3
$70,000–$79,999	16	7.7
$80,000–$89,999	27	13.0
$90,000–$99,999	19	9.1
$100,000–$109,999	13	6.3
$1500,000 or more	1	0.5
Total	*208*	*100.0*

development, various analytical tools like Cronbach's alpha, item to total correlation and factor analysis were used. The steps included detail item, exploratory factor analysis (EFA) and finally the confirmatory factor analysis (CFA) for analyzing the initial assessment of the reliability, unidimensionality and convergent and discriminant validity. The fit of the model was estimated using AMOS 26.0. and was assessed through the indices of CMIN, comparative fit index (CFI), Tucker–Lewis index (TLI), normed fit index (NFI), Akaike information criterion (AIC), parsimony normed fit index (PNFI) and root mean square error of approximation (RMSEA). The procedure followed in this study for scale refinement and development is based on the well-accepted paradigm followed by the various authors stated above.

In line with the various researchers stated above multiple criteria were used for checking the various psychometrics of the scale. For Cronbach's alpha, a value of less than 0.6 indicated unsatisfactory internal consistency reliability, and all correlations above 0.6 were considered desirable. For exploratory factor analysis (EFA), Kaiser–Meyer–Olkin (KMO) value was determined which is a measure of sampling adequacy and is an index used to examine the appropriateness of factor analysis. High values between 0.5 and 1.0 were considered as indicative for the factor analysis to be an appropriate analysis technique. Items with low factor loadings of 0.60 or low communalities of 0.30 were considered items for deletion. The maximum acceptable p value for Bartlett's test was taken as 0.05. Based on the above stated criteria, the psychometrics of the scale used in this study was examined.

Results

Table 2 titled "Cronbach alpha and item to total correlation for scale on coronavirus shopping anxiety" contains the results obtained on testing the psychometrics of the scales on all the 11 items comprising the Coronavirus Shopping Anxiety Scale. As seen in Table 2, the results obtained in the present study are very satisfactory, Cronbach alpha is 0.925 and all the item to total correlations are significant and range between 0.651 and 0.843.

Table 3 titled "Results of exploratory factor analysis (EFA) and confirmatory factor loadings (CFA) for scale on coronavirus shopping anxiety" contains various measures of EFA and confirmatory factor loadings for all the items of the scale.

The EFA is conducted using principal component analysis as an extraction method and varimax as the rotation method. EFA for the Coronavirus Shopping Anxiety Scale revealed two factors (a and b). The factor "a" is named "Coronavirus in-store shopping anxiety" and contains six items. The factor "b" is named as "Coronavirus online shopping anxiety" and contains five items. Coronavirus in-store shopping anxiety factors include items related to the anxiety of getting a virus from in stores, anxiety related to the stores not following the hygiene protocols, the anxiety of catching the virus by touching any items in the public place and mail packets, the anxiety of loved ones getting the virus and anxiety resulting into buying the products in bulk. Coronavirus online shopping anxiety factor includes items related to the online anxiety regarding the durability and quality of the products, wasting money on online shopping, anxiety related to buying expensive products online, being overwhelmed by the number of products available online and anxiety related to the authenticity of the content present on the social media.

As depicted in Table 3, all the results are well within acceptable limits. KMO value is 0.920, Bartlett test of sphericity is significant and the percentage of variance explained is 68.41%. Majority of the factor loadings for all the items are high except for SA6 stating " I always bought in bulk while shopping because of the anxiety of the shortage of products in the market" from factor a (Coronavirus in-store shopping anxiety) and SA11 stating " I had a fear about the authenticity of the content present on the social media of a product which impacted my shopping" from factor b (Coronavirus online shopping anxiety), which had factor

Item code	Scale items	Cronbach alpha – if item is deleted	Item to total co-relation
Cronbach alpha = 0.925			
SA1	I felt a great deal of anxiety of going to shops, because I fear I might catch virus	0.915	0.802
SA2	I had a great deal of anxiety that the hygiene protocols recommended by the CDC was not followed by the public and stores at large	0.920	0.712
SA3	I felt a great deal of anxiety that if I touched something in a public space, I would catch the virus	0.914	0.825
SA4	I felt a great deal of anxiety that by touching any packet in the mail, I would catch virus	0.913	0.843
SA5	I had a great deal of anxiety that if my loved ones catch the virus, I will not be able to protect them	0.923	0.651
SA6	I always bought in bulk while shopping because of the anxiety of the shortage of products in the market	0.918	0.750
SA7	I was stressed during online shopping for the durability and quality of the product	0.918	0.763
SA8	I was overwhelmed with the number of brands, substitutes available in online shopping	0.917	0.777
SA9	I had a great fear while buying an expensive product online	0.918	0.759
SA10	I had an intense fear of wasting my money while shopping online	0.921	0.702
SA11	I had a fear about the authenticity of the content present on the social media of a product which impacted my shopping	0.920	0.719

Table 2.
Cronbach alpha and item to total correlation results for scale on coronavirus shopping anxiety

loadings less than 0.60, as this was considered the minimum threshold for the deletion. All the communalities are above the minimum acceptable level. Thus, two items were deleted and an 11-item scale was reduced to a 9-item scale at this stage.

After conducting EFA, CFA was conducted to further purify the items of the scale. Table 3 highlights the CFA factor loadings. All the CFA loadings are high than 0.6 and are well within the acceptable limits and no deletion is required at this stage. Further, the nine-item confirmatory model of coronavirus shopping anxiety was estimated using AMOS 26.0. The fit of the model was assessed through the following indices: goodness of fit index (GFI), adjusted goodness of fit (AGFI), CFI, NFI and RMSEA. The minimum cut-off criteria for deletion of items was based on the research done by various authors (Byrne, 2001; Hair *et al.*, 1998; Forsythe *et al.*, 2006; Guarino *et al.*, 2001). Specific cutoffs were set for CFI (>0.90) and RMSEA (<0.06). The confirmatory factor analysis indicated that the nine-item scale had a good model fit: x2 = 108.72, df = 43; NFI = 0.946; CFI = 0.966 and RMSEA = 0.06. No further modification was needed for this scale. The detail results of the CFA are shown in Table 4.

Validity and reliability tests

The final step for the scale development and purification is by checking the reliability and validity of the various constructs. Two types of criterion related validity were assessed for the perceived risk and benefits scale, namely convergent validity and discriminant validity. Construct validity shows whether the scale at hand measures the construct under study. It is composed of convergent and discriminant validity. A measure is said to possess convergent validity if independent measures of the same construct are highly correlated in other words this validity means that the scale at hand correlates positively with other scales measuring the same construct. Discriminant validity shows that the scale for a specific construct does

Item code	Scale items	EFA analysis results Eigenvalues >1 KMO = 0.920 Sig. Of Barlett's test of sphericity = 0.000 Total % of variance explained = 68.41% Communalities	EFA factor loadings a	b	Confirmatory factor analysis CFA factor loadings a	b
SA1	I felt a great deal of anxiety of going to shops, because I fear I might catch virus	0.566	0.857		0.87	
SA2	I had a great deal of anxiety that the hygiene protocols recommended by the CDC was not followed by the public at large	0.669	0.800		0.71	
SA3	I felt a great deal of anxiety that if I touched something in a public space, I would catch the virus	0.729	0.778		0.88	
SA4	I felt a great deal of anxiety that by touching any packet in the mail, I would catch virus	0.763	0.764		0.90	
SA5	I had a great deal of anxiety that if my loved ones catch the virus, I will not be able to protect them	0.713	0.717		0.82	
SA6	I always bought in bulk while shopping because of the anxiety of the shortage of products in the market	0.809	0.574*		–	
SA7	I was stressed during online shopping for the durability and quality of the product	0.757		0.838		0.85
SA8	I was overwhelmed with the number of brands, substitutes available in online shopping	0.767		0.794		0.74
SA9	I had a great fear while buying an expensive product online	0.527		0.794		0.79
SA10	I had an intense fear of wasting my money while shopping online	0.678		0.792		0.83
SA11	I had a fear about the authenticity of the content present on the social media of a product which impacted my shopping	0.548		0.575*		-

Note(s): *items dropped from subsequent analysis

Table 3. Results of exploratory factor analysis (EFA) and confirmatory factor analysis loadings (CFAs) for scale on coronavirus shopping anxiety

Psychometric testing	Value
CMIN	2.59
Comparative fit index (CFI)	0.966
Tucker–Lewis index (TLI)	0.953
Normed fit index (NFI)	0.946
Akaike information criterion (AIC)	123.334
Parsimony normed fit index (PNFI)	0.683
Root mean square error of approximation (RMSEA)	0.06
Average variance extracted (AVE)	0.638
Square root of AVE	0.798
Composite reliability (CR)	0.940

Table 4. Confirmatory factor analysis results for scale on coronavirus shopping anxiety

not correlate with other constructs (Malhotra, 2005); in other words, this validity requires that a measure does not correlate too highly with measures from which it is supposed to differ. The average variance extracted (AVE) is used to test construct validity. Values for AVE that are higher than 0.5 are required to show a good convergent validity and show trust in the results. The square root of AVE is used to test for discriminant validity (Fornell and Larcker, 1981). Table 4 shows that all the results of the scale are within the expectable limit and justifies the validity as the AVE extracted for the scale is 0.638, and the square root of AVE is 0.798.

The internal-consistency reliability of the survey is calculated using Cronbach alpha as well as composite reliability (CR) scores. Cronbach alpha is reported to be sensitive to increasing items per latent variable. Therefore, CR is used to support the reliability scores obtained from Cronbach alpha (Raykov, 1997). Table 4 shows that the CR result of the scale is 0.940, which is high and highlights a high internal-consistency reliability.

Discussion and implications

A large number of researchers have studied and developed a scale for the anxiety and fear related to the coronavirus pandemic. Numerous studies and conceptual frameworks well documented in the literature have also studied the change in the shopping behavior of a consumer during a pandemic. Notably absent is a concerted effort to review and assess the impact of coronavirus shopping anxiety on consumers. This research offers important theoretical and practical implications for the researchers, companies and marketing professionals. Anxiety is considered an unpleasant emotional state, characterized by tension, apprehension and worry, and occurs in response as a threat to a self-preservation goal (Arkin and Ruck, 2007), which can impact the mental health and well-being of a consumer. Shopping motives have been identified as important determinants of decision-making (Forsythe *et al.*, 2006). Decision-making is a conscious and deliberate process (Sachdeva, 2020), and the richness and diversity of information available today, regarding coronavirus, pose a great challenge for consumers. This research integrated the elements from the previous traditional anxiety construct and decision-making frameworks in light of the pandemic. This resulted in the development of a new nine-item scale for studying the coronavirus shopping anxiety behavior of consumers.

The items of the scale developed in this research portray a wide variety of reasons to explain the anxiety in the shopping behaviors of the consumers impacted by the coronavirus, which subsequently affect the mental state of the consumers. The scale resulted in highlighting two factors related to anxiety: in-store shopping anxiety and online shopping anxiety. In-store shopping anxiety highlighted the fears of catching the virus while shopping in person. Individuals are generally motivated to minimize their experiences of arousal generated via such tensions, inconsistencies or mixed emotions (Penz and Hogg, 2011), and this resulted in shopping online during the pandemic. The focus group also highlighted the anxiety related to online shopping. The youth of the focus group narrated examples of the older generation being hesitant about online shopping in their family. The pandemic reflected a sense of insecurity, inconvenience and lack of confidence among online shoppers. These attributes are reflected in the scale development. While online shopping, anxiety was caused due to the number of alternatives available online that triggered the levels of difficulty for decision-making among the consumers as consumers were forced to go for online shopping because of the lockdown and protecting themselves from catching the virus. Technology anxiety also has an impact on consumers' skepticism while shopping, and consumers' experiences of feeling stimulated or overwhelmed by websites when shopping online (Fiore *et al.*, 2005) also added to the anxiety. The comparison between the products and brands available online increased the magnitude of consumer online shopping anxiety as they were

not used to shopping online and were forced to do so during the pandemic. Subsequently, consumers experience greater difficulty in making a purchase decision. This development of the scale highlights the inclusion of both in-store and online shopping anxiety among the consumers impacted by the pandemic.

This research explored the association between coronavirus and shopping behavior. The analysis indicated a two-factor scale for coronavirus shopping anxiety. For the factor – in-store shopping, the anxiety was primarily related to catching the virus from in-store. In contrast, the anxiety related to online shopping was primarily associated with confusion and lack of confidence in buying a product online. Second, these two factors revealed by this research can provide valuable inputs for the marketers to design their marketing strategies, which results in a practical value proposition for the company. Subsequently, managers have an essential role in educating the consumers about the safety protocols implemented in their stores to protect the consumers from a pandemic. Social media should also be leveraged as a medium for developing confidence among the consumers about the protection measures adopted by the companies and should share factually correct information. The scale items would benefit the managers for assessing the COVID-19 fear, not only as an outcome measure but also for understanding the consumers psychologically related to shopping. This ability might assist managers and decision-makers in screening those who are more prone to fear during the COVID-19 pandemic and foster different strategies while targeting the relevant groups. There is limited research on the impact of the pandemic on the shopping anxiety of consumers. This research will help the business to design their strategies in a way to gain the confidence of the consumers by highlighting the measures that they should adopt for protecting the consumers against the virus while shopping in-store and online. Businesses should also focus and highlight the technological advancements and innovative strategies incorporated in the stores for protecting the consumers from the virus while shopping. Effective strategies developed in this direction will result in the reduction of shopping anxiety which will subsequently enhance customer satisfaction, retention, loyalty and repeat purchases. Finally, this research gave businesses, companies and firms a perspective and vision to look into the minds of the consumer's shopping anxiety behaviors. Companies, firms and marketers could use this scale to investigate the various shopping anxiety perceptions among consumers in society. In addition, firms and health professionals could motivate and gain the trust in society by sharing the success stories of the shopping experience of other consumers impacted by the coronavirus.

Conclusion

The present study resulted in the development of a scale for measuring coronavirus shopping anxiety through a series of steps of scale refinement and purification process. The scale development is supported by qualitative research and quantitative analysis. The results from the samples related to shopping anxiety are supported in terms of nomological validity, construct validity and discriminant validity. The internal consistency reliability was assessed through Cronbach alpha as well as CR scores. Further, item analysis, EFA and CFA supported the development of the scale. In conclusion, this study resulted in the development of a nine-item scale with robust psychometric properties that could be used by aspiring researchers.

The scale demonstrated two factors for the shopping anxiety of the consumers. The scale developed captures a wide variety of reasons why consumers have coronavirus shopping anxiety. In this regard, two issues are worth noting. First, items related to anxiety caused by visiting stores, touching the items or doubt about the hygiene protocols followed, load on one factor "in-store shopping anxiety". Moreover, items related to trust in quality, durability, authenticity, risk about buying expensive products online load on another factor "online-shopping anxiety".

The results of the current study provide further support for the validity and reliability of the consumer's shopping anxiety. This scale demonstrated robust properties among the US population. Although past analysis of the CAS pointed to a unidimensional model (Ahorsu *et al.*, 2020; Lee, 2020; Broche-Pérez *et al.*, 2020; Evren *et al.*, 2020) only these research findings provide support for the two-factor structure model for the shopping anxiety, in particular, separating coronavirus in-store shopping anxiety from coronavirus online-shopping anxiety. Together, these two factors explain the coronavirus shopping anxiety among the consumers during this time.

Finally, the anxiety related to shopping has resulted in the emergence of many technology-dependent businesses. The consumer after experiencing pandemic has realized that modern life is depending upon science and technology. The emergence of many businesses, like online car selling and buying, home delivery of products and work from home has given consumers a sense of ease, comfort, convenience and satisfaction. To a great extent, the pandemic has made consumers dependent upon technology, and it reflects in the everyday shopping behavior of a consumer.

Limitations

Some limitations exist in this study. The study sample is relatively small and restricted to one country. Further, the concentration of the sample is among the age group of 25–44 years. This accounts for 60% of the total sample and acts as a limitation of the study. A more equal age distribution sample should be considered for the scale development process. Cross-country evaluation of the Coronavirus Shopping Anxiety Scale with relatively a larger sample will validate the scale more. Further, there is not any specific product category for which the shopping anxiety is measured. Future researchers could ascertain the shopping anxiety caused due to the coronavirus on essential and non-essential product categories. Additionally, the respondents of the study are well educated and conversant with Internet as the data were collected through an online survey. A more diverse group could be studied for future research with less educated people and with those who are beyond the scope of the Internet. As the usage of the five-point Likert scale is too small to be treated quantitatively (the possible dispersion is small and therefore creates problems). Future researchers should plan to use a seven-point or a ten-point Likert scale to avoid such discrepancies. Finally, the researcher suggests replicating this research in different services sector with different analytical techniques, like structural equation modeling.

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Corruption and corporate investment efficiency around the world

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Abstract

Purpose – The paper investigates the effect of corruption on corporate investment efficiency around the world.

Design/methodology/approach – The sample includes 218,350 observations from 30,074 firms across 42 countries. The authors measure corruption based on the Corruption Perception Index (CPI) from Transparency International, Corruption Control Index (CCI) from the World Bank and Corruption Index from the International Country Risk Guide.

Findings – The authors find that corruption is negatively related to investment efficiency. The robustness checks with different measures of corporate investment and alternative regression approaches show consistent findings. Moreover, the authors also find that the effect of corruption is stronger (weaker) in strong (weak) shareholder protection countries.

Originality/value – The paper has two important contributions to the literature. First, it shows that corruption environment is also a determinant of corporate investment efficiency. Second, legal protection of shareholders can mitigate the negative effect of corruption on corporate investment efficiency.

Keywords Corruption, Investment efficiency, Investment

Paper type Research paper

1. Introduction

Modigliani and Miller (1958) posit that investment opportunities are the only determinant of corporate investment. Nevertheless, several market frictions are present in the real world; thus, corporate investment fails to archive its optimal status. Prior research shows that corporate investment efficiency is not only determined by firm-specific factors (Boubakri *et al.*, 2013; Chen *et al.*, 2006, 2017; Jensen and Meckling, 1976; Jiang *et al.*, 2011; Myers, 1977; Myers and Majluf, 1984b) but also by country-specific factors, such as shareholder protection (Xiao, 2013) and national culture (Zhang *et al.*, 2016). Recently, the effect of corruption on corporate financial decisions has attracted much attention from academics (Baxamusa and Jalal, 2014; Thakur and Kannadhasan, 2019; Tran, 2019, 2020a; Wang and You, 2012). This paper investigates how corruption influences corporate investment efficiency.

Cai *et al.* (2004), Svensson (2003), Wang and You (2012), Wei and Kaufmann (1999) and Xu *et al.* (2017) show that firms pay bribes to government officials as "grease money" and/or "protection money". Thakur and Kannadhasan (2019) and Tran (2020a) also find that firms in high corruption countries tend to save more cash for their bribery payment. These prior studies imply that managers in a highly corrupt environment are more flexible to use firm resources. Therefore, managers may exploit this flexibility to overinvest in unprofitable

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projects and reduce investment in profitable projects (Jensen and Meckling, 1976). This behavior leads to lower investment efficiency.

Following Baker *et al.* (2003) and Chen *et al.* (2017), we propose a model to examine how corruption influences the investment-investment sensitivity. Using a research sample of 218,350 firm years from 30,074 firms across 42 countries, we find that all corruption measures are negatively related to investment efficiency. Our robustness tests with various measures of corporate investment and alternative regression approaches report consistent findings. Moreover, prior research shows that legal protection of shareholders reduces agency costs and improves management quality. Therefore, we argue that the negative effect of corruption on investment efficiency is weaker in countries of strong shareholder rights. We divide the full sample into two sub-samples of strong and weak shareholder protection based on anti-self-dealing index, investor protection index and legal origin. We find that all corruption indices become more effective in corporate investment efficiency in weak shareholder protection countries.

This paper makes two contributions to the literature. First, prior studies document that corruption affects corporate financial decisions, such as cash holdings (Thakur and Kannadhasan, 2019; Tran, 2020a), dividend policy (Tahir *et al.*, 2020; Tran, 2019), capital structure (Singh and Kannadhasan, 2020), corporate risk-taking (Chen *et al.*, 2015b; Tran, 2020b), firm growth (Nguyen and Van Dijk, 2012) and investment growth (Asiedu and Freeman, 2009). However, they have not fully addressed how corruption determines corporate investment efficiency. This paper shows that managers take advantage of corrupt environments to increase overinvestment. Moreover, it provides additional evidence to support the negative relationship between corruption and national economic efficiency (Brunetti *et al.*, 1998; Doh and Teegen, 2003; Gründler and Potrafke, 2019; Zakharov, 2018). Second, while prior studies investigate the effect of shareholder protection on dividend policy (La Porta *et al.*, 2000b; Tran *et al.*, 2017) and cash holdings (Dittmar *et al.*, 2003; Iskandar-Datta and Jia, 2014), we examine the role of shareholder protection in mitigating the negative effect of corruption on corporate investment efficiency.

The rest of the paper is organized as follows. Section 2 reviews prior studies and develops main theoretical hypotheses. Section 3 and Section 4 describe the empirical strategy and the utilized data. Section 5 presents regression results and robustness checks. Section 6 concludes.

2. Corruption and investment

2.1 Literature review

Corruption is defined as behavior driven by personal interest to exploit public power and position (Jain, 2001). Main causes of corruption include market structure (Ades and Di Tella, 1999); legal, political and socioeconomic environment (Paldam, 2002; Treisman, 2000); institutional quality (Acemoglu *et al.*, 2001) and legal effectiveness (Herzfeld and Weiss, 2003). From a macroeconomic perspective, prior research shows that corruption tends to deteriorate economic efficiency. In a pioneer study, Mauro (1995) documents that corruption has a negative impact on investment, which in turn reduces national economic growth. Following studies also find that a high corruption environment is detrimental for investment (Brunetti *et al.*, 1998; Doh and Teegen, 2003; Zakharov, 2018). Lambsdorff and Cornelius (2000) document that corruption negatively affects both foreign direct investment and economic growth across 26 African countries.

Although many prior macroeconomic studies consistently show the negative relationship between corruption and economic performance, the effect of corruption on economic efficiency at firm level is still debatable. Svensson (2003) and Wang and You (2012) document a positive relationship between bribery payment and firm growth. However, Nguyen and Van Dijk (2012) find that corruption is negatively related to growth of private firms. Measuring corruption by entertainment and travel costs, Cai *et al.* (2004) find that some components of

these costs are positively associated with firm profitability despite their overall negative effect on firm productivity. Using the World Bank database of enterprise surveys, Sharma and Mitra (2015) show that the relationship between bribery and firm performance is rather mixed although they find positive effects of bribery on product innovation and export performance.

Corporate investment is important in corporate finance as it determines firm value. According to Modigliani and Miller (1958), corporate investment decisions are driven only by investment opportunities. Nevertheless, market frictions, such as information asymmetry and agency problem, make corporate investment deviate from its optimal status (Chen *et al.*, 2017). According to Jensen and Meckling (1976), due to the separation of corporate ownership and control, managers have high incentives to serve their own benefits by overinvesting corporate cash in negative net present value (NPV) projects. Harford (1999), Jiang *et al.* (2011) and Richardson (2006) show supporting evidence of this behavior. Chen *et al.* (2017) find that foreign investors play an important role in monitoring managers and thus help firms increase their investment efficiency. At the country level, Xiao (2013) analyzes how shareholder protection affects research and development (R&D) expenditure and finds that shareholder protection reduces both underinvestment and overinvestment. Furthermore, Asiedu and Freeman (2009) use the database of the World Business Environment Survey to examine how internal, external and hybrid measures of corruption influence corporate investment growth. They find that these corruption measures are negatively associated with investment growth in transition markets. This paper investigates the effect of corruption on corporate investment efficiency and its transmitting mechanism. Unlike Asiedu and Freeman (2009), we construct our sample from Compustat database.

2.2 Hypotheses

In this paper, we argue that in corrupt environments, firms have to pay bribes in order to receive better public services (e.g. lower red tape and better access to scarce resources) and/or reduce state predation (e.g. property right protection and tax reduction) (Cai *et al.*, 2004; Svensson, 2003; Wang and You, 2012; Wei and Kaufmann, 1999; Xu *et al.*, 2017). Since bribes are made unofficially, managers need more flexibility in using corporate cash. Thakur and Kannadhasan (2019) and Tran (2020a) also find that firms in countries of higher corruption tend to have more cash holdings and save more cash from their cash flows. Therefore, corporate managers may take advantage of this opportunity to expropriate shareholders. Managers in high corruption countries are more likely to reduce investment in profitable projects and use more corporate cash to overinvest in negative NPV projects. Based on these arguments, we hypothesize that corruption negatively affects corporate investment efficiency.

H1. Corruption is negatively related to corporate investment efficiency.

In addition, several prior studies document that shareholder protection is important to mitigate the agency problem in corporate financial decisions, namely dividend policy (La Porta *et al.*, 2000b; Tran *et al.*, 2017) and corporate liquidity (Dittmar *et al.*, 2003; Iskandar-Datta and Jia, 2014). Therefore, we argue that the negative effect of corruption on firm investment efficiency is stronger in countries of poor shareholder rights.

H2. The negative relationship between corruption and investment efficiency is stronger in countries of weak shareholder protection.

3. Data source

We construct our research data from Compustat database. Following Bates *et al.* (2009), we consider R&D expenditure as zero if it is unavailable. For subsequent analyses, we eliminate firms classified into utilities industry (SIC codes from 6,000 to 6,999) and financial industry (SIC codes from 4,900 to 4,999) since these industries are highly regulated and have different

accounting standards (Fama and French, 2001). Then, we delete 149 firm years with negative total assets to avoid meaningless variables. The final sample consists of 218,350 firm years from 30,074 firms across 42 countries over the period 2002–2015. To avoid outliers' effects, we winsorize all financial variables at 2% [1].

Prior research shows that there are three prominent corruption measures including the Corruption Perception Index (CPI) from Transparency International, Corruption Control Index (CCI) from the World Bank and Corruption Index (ICI) from the International Country Risk Guide. However, each measure has its own weaknesses. According to Gründler and Potrafke (2019), the ICI tends to measure investment risk of corruption rather than corruption *per se*. The CCI is criticized for many problems arising from its calculation method [2] (Langbein and Knack, 2010; Qu *et al.*, 2019). The CPI has been used as the main measure of corruption in many macroeconomic studies (Aidt, 2003, 2009; Gründler and Potrafke, 2019) and several studies at firm level (Asiedu and Freeman, 2009; Chen *et al.*, 2015b; Tahir *et al.*, 2020; Thakur and Kannadhasan, 2019; Tran, 2019, 2020a, b). However, its weakness is the incomparability in its calculation methodology. From 2012, Transparency International employs raw scores instead of country rankings to calculate the CPI. Therefore, we use the three corruption measures in our study in order to ensure that our findings are robust.

Before 2012, the CPI ranges from 0 to 10 but from 2012, its scale changes, and the value of CPI varies from 0 to 100. Lower values of CPI indicate higher corruption. In addition, the CCI originally ranges from −2.5 to 2.5, and its lower values also denote higher corruption. Therefore, we reverse and rescale both CPI ad CCI values so that new scales range from 0 to 1 and their higher values imply higher corruption (Please see formulas to obtain these new scales in Appendix). Besides, we fail to rescale the ICI since its scale is from 0 to 1 and its higher values indicate higher levels of corruption.

4. Empirical strategy

Following Baker *et al.* (2003) and Chen *et al.* (2017), we employ the investment-investment opportunities as a proxy for firm investment efficiency and use an interaction between corruption index and investment opportunities to investigate how corruption affects investment efficiency.

$$\mathrm{INV}_{i,j,t} = \alpha + \beta_1 \mathrm{TOB}_{i,j,t-1} + \beta_2 \mathrm{CI}_{j,t} + \beta_3 \mathrm{TOB}_{i,j,t-1} * \mathrm{CI}_{j,t} + \varphi_1 \mathrm{F\_con}_{i,j,t-1} + \eta_j \mathrm{C\_con}_{j,t} + \pi \mathrm{Industry\ dummies} + \Omega \mathrm{Year\ dummies} + \omega \mathrm{Country\ dummies} + \varepsilon_{i,j,t} \quad (1)$$

where $X_{i,j,t}$ represents variable X of firm i in country j in year t. INV is corporate investment. TOB is Tobin's Q. CI is corruption index. F_con is a vector of firm-specific control variables including profitability (PRO), cash holdings (CAS), operating cash flow (OCF), financial leverage (LEV), asset tangibility (TAN), firm size (SIZ), net working capital (NWC) and dividend payout (DPR). Firms with high profitability, more cash holdings and cash flow tend to have higher investment expenditure since they have more resources (Chen *et al.*, 2017). According to pecking order theory (Myers and Majluf, 1984a), firms with high leverage, low tangibility and small size face high costs of external funds; therefore, their investment is low. Increases in net working capital and dividends lead to decreases in cash holdings. Consequently, firms with high net working capital and dividend payment have low investment expenditure. C_con is a vector of country-specific control variables, namely shareholder protection (AD) (Xiao, 2013), creditor protection (CR) (González, 2016), individualistic culture (ID) [3], private credit (Pcre), market capitalization (Mcap), GDP per capita (Gcap), inflation rate (Infla) and Rule of law (Rlaw). Definitions of all variables are presented in Table 1. Since shareholder protection, creditor protection and individualistic culture are nontime-varying variables, we use pooled ordinary least squares (OLS) as the

Variables	Variable names	Definitions
INV_t	Corporate investment	Total capital expenditure and R&D expenditure in year t divided by total assets in year $t-1$
TOB_{t-1}	Tobin's Q	Total market value of common equity and book value of debt divided by total assets in year $t-1$
CI_t	Corruption index	Corruption perception index from transparency international, control of corruption index from world bank and corruption index from international country risk guide in year t
PRO_{t-1}	Profitability	Net income to total assets in year $t-1$
CAS_{t-1}	Cash holdings	Cash and short-term investment to total assets in year $t-1$
OCF_{t-1}	Cash flow	Operating cash flow to total assets in year $t-1$
LEV_{t-1}	Financial leverage	Total debt to total assets in year $t-1$
TAN_{t-1}	Asset tangibility	Property, plant and equipment to total assets in year $t-1$
SIZ_{t-1}	Firm size	Natural logarithm of total assets in USD in year $t-1$
NWC_{t-1}	Net working capital	Current assets minus current liabilities, cash and short-term investment divided by total assets in year $t-1$
DPR_{t-1}	Dividend payout ratio	Cash dividends to total assets in year $t-1$
AD	Shareholder protection	Anti-self-dealing index from Djankov *et al.* (2008)
CR	Creditor protection	Revised creditor right index from Djankov *et al.* (2007)
ID	Individualistic culture	Individualism index from Hofstede (2001)
$Pcre_t$	Private credit	Domestic private credit to GDP provided by world bank in year t
$Mcap_t$	Stock market capitalization	Stock market capitalization to GDP provided world bank in year t
$Gcap_t$	GDP per capita	Natural logarithm of annual GDP per capita provided by world bank in year t
$Infla_t$	Inflation rate	Annual inflation rate provided by world bank in year t
Rlaw	Rule of law	Rule of law index is from international country risk guide. It ranges from 0 to 10 and its higher scores imply more tradition of law and order

Table 1.
Research variables

primary regression. However, we also present results of other regression methods as robustness checks.

Besides, we add dummy variables to control the effects of industry, year and country in all regression models. The incomparability problem of CPI is also controlled to some extent by year dummies [4].

5. Empirical results

5.1 Descriptive statistics

Table 2 describes our research data. Firm-specific data in Panel A shows that investment expenditure constitutes from 0% to 53% of total assets, and its average value is 9%. Tobin's Q is 1.82 on average. It varies from 0.49 to 10.67. In addition, Panel B reports that the annual number of firms increases dramatically over the research period. There are 11,127 firms in 2002 and 18,333 firms in 2015. Furthermore, the industry distribution in Panel C shows that manufacturing is the largest industry with 119,275 firm years, followed by service industry with 40,701 firm years and mineral industries with 16,155 firm years. The number of observations from other industries varies from 7,100 to 14,000. Moreover, Panel D presents country-level data. The USA contribute the largest amount of firm years to the research sample with 49,263. Japan and China have 31,119 and 20,194 observations, respectively. These three countries constitute about 46% observations of the full sample. This sample composition problem may lead to biased results, but it is present regardless of data source. Therefore, we need to use a reduced sample without these countries in order to check the robustness of our research findings.

Panel A. Firm-level data

Variables	Mean	Median	SD	25%	75%	Min	Max
INV_t	0.09	0.05	0.11	0.02	0.11	0.00	0.53
TOB_{t-1}	1.82	1.22	1.82	0.91	1.91	0.49	10.67
PRO_{t-1}	−0.03	0.03	0.23	−0.02	0.06	−1.16	0.22
CAS_{t-1}	0.17	0.11	0.18	0.04	0.24	0.00	0.76
OCF_{t-1}	0.19	0.22	0.37	0.06	0.40	−1.34	0.82
LEV_{t-1}	0.51	0.49	0.27	0.31	0.66	0.06	1.41
TAN_{t-1}	0.29	0.25	0.22	0.10	0.43	0.01	0.84
SIZ_{t-1}	12.11	12.09	2.07	10.75	13.44	7.46	16.76
NWC_{t-1}	0.01	0.02	0.20	−0.08	0.13	−0.65	0.42
DPR_{t-1}	0.01	0.00	0.02	0.00	0.02	0.00	0.10

Panel B. Annual number of firms

Year	*N*	Year	*N*	Year	*N*	Year	*N*
2002	11,127	2006	14,286	2010	16,796	2014	18,551
2003	12,675	2007	15,198	2011	16,898	2015	18,333
2004	13,180	2008	15,671	2012	17,835		
2005	13,357	2009	16,004	2013	18,439		

Panel C. Industry distribution

Industry	2-digit SIC	*N*	Industry	2-digit SIC	*N*
Mineral industries	10–14	16,155	Wholesale trade	50–51	10,346
Construction industries	15–17	7,151	Retail trade	52–59	10,788
Manufacturing	20–39	119,275	Service industries	≥70	40,701
Transportation and communications	40–48	13,934			

Panel D. Country-level data

Country	No. obs	No. firms	INV	TOB	ID	AD	CR
Australia	11,337	1,754	0.13	2.08	90	0.76	3
Austria	569	69	0.09	1.34	55	0.21	3
Belgium	832	105	0.10	1.50	75	0.54	2
Brazil	1,975	269	0.07	2.89	38	0.27	1
Canada	9,440	1,657	0.14	2.02	80	0.64	1
Switzerland	1,793	200	0.08	1.78	68	0.27	1
Chile	820	121	0.06	4.08	23	0.63	2
China	20,194	2,473	0.08	2.26	20	0.76	2
Colombia	155	25	0.05	1.20	13	0.57	0
Germany	5,191	655	0.08	1.52	67	0.28	3
Denmark	761	119	0.10	1.98	74	0.46	3
Spain	862	117	0.05	1.54	51	0.37	2
Finland	1,095	135	0.09	1.60	63	0.46	1
France	5,395	689	0.07	1.49	71	0.38	0
United Kingdom	8,944	1,397	0.09	1.83	89	0.95	4
Greece	1,949	229	0.04	1.10	35	0.22	1
Hong Kong	1,272	139	0.06	1.48	25	0.96	4
Hungary	166	24	0.09	1.37	80	0.18	1
Indonesia	2,735	373	0.07	2.51	14	0.65	2
India	15,755	2,656	0.08	1.43	48	0.58	2
Ireland	391	60	0.08	1.62	70	0.79	1
Israel	2,099	355	0.09	2.36	54	0.73	3
Italy	1,535	232	0.05	1.32	76	0.42	2
Jamaica	26	11	0.05	1.38	39	0.35	2

Table 2.
Research data description

(*continued*)

Panel D. Country-level data Country	No. obs	No. firms	INV	TOB	ID	AD	CR
Japan	31,119	3,053	0.05	1.12	46	0.50	1
South Korea	9,186	1,447	0.07	1.12	18	0.47	3
Mexico	786	98	0.07	1.32	30	0.17	0
Malaysia	7,508	840	0.05	1.14	26	0.95	3
Netherlands	1,395	176	0.07	1.58	80	0.20	3
Norway	1,512	244	0.10	2.35	69	0.42	2
New Zealand	593	120	0.09	2.09	79	0.95	4
Pakistan	1,695	257	0.07	1.33	14	0.41	1
Peru	522	74	0.07	1.44	16	0.45	0
Philippines	1,008	147	0.06	1.98	32	0.22	1
Poland	2,929	490	0.07	1.51	60	0.29	1
Portugal	434	52	0.04	1.18	27	0.44	1
Singapore	5,048	629	0.06	1.27	20	1.00	3
Sweden	2,669	476	0.07	1.93	71	0.33	1
Thailand	4,341	492	0.07	1.44	20	0.81	2
Turkey	1,512	260	0.07	2.13	37	0.43	2
USA	49,263	7,152	0.12	2.47	91	0.65	1
South Africa	1,539	203	0.08	1.52	65	0.81	3

Note(s): INV_t is corporate investment in year t. TOB_{t-1} is Tobin's Q in year $t-1$. CI_t is corruption index in year t. PRO_{t-1} is profitability in year $t-1$. CAS_{t-1} is cash holdings in year $t-1$. OCF_{t-1} is operating cash flow in year $t-1$. LEV_{t-1} is financial leverage in year $t-1$. TAN_{t-1} is asset tangibility in year $t-1$. SIZ_{t-1} is firm size in year $t-1$. NWC_{t-1} is net working capital in year $t-1$. DPR is dividend payout ratio in year $t-1$

Table 2.

5.2 Regression results

Table 3 presents pooled OLS regression results to investigate how corruption affects corporate investment efficiency. In line with Modigliani and Miller (1958), we find that Tobin's Q is positively related to firm investment at 1% of significance. This indicates that firms with more investment opportunities tend to increase their investment expenditure. Remarkably, we document that the interactions between all measures of corruption and Tobin's Q are negatively associated with investment expenditure. These findings imply that corruption reduces corporate investment efficiency across countries due to agency problem. Firms in highly corrupt countries tend to pay bribes as "grease money" (e.g. payment for lower red tape and better access to scarce resources) and/or "protection money" (e.g. payment for property right protection and tax reduction) (Cai *et al.*, 2004; Svensson, 2003; Wang and You, 2012; Wei and Kaufmann, 1999; Xu *et al.*, 2017). Therefore, their managers are more flexible in corporate liquidity decisions (Thakur and Kannadhasan, 2019; Tran, 2020a). They take this opportunity to expropriate shareholders by reducing investment in profitable projects and diverting more investment into negative NPV projects. This expropriation leads to lower investment efficiency.

Besides, we find that firms with higher cash holdings and cash flow tend to have higher investment. In line with Myers and Majluf (1984a), firms with higher leverage and lower tangibility incur higher costs of external financing; therefore, they have lower investment. Net working capital is a substitute of cash holdings and dividends are cash distribution. Consequently, they negatively affect firm investment. Moreover, the negative relationship between antiself-dealing index and investment expenditure indicates that shareholder protection may reduce overinvestment (Xiao, 2013). Consistent with Shao *et al.* (2013b), individualism positively influences firm investment.

5.3 Robustness checks

In order to ensure that our research findings are stable, we conduct the following robustness checks. First, we replicate all regression models with a reduced sample without USA, Japan and

Variables	CI is based on the Corruption Perception Index	CI is based on the Corruption Control Index	CI is based on the International Country Risk Guide
Intercept	−0.0234 (−1.20)	−0.0523*** (−3.01)	0.0203 (1.08)
$TOB_{i,t-1}$	0.0217*** (29.95)	0.0223*** (29.27)	0.0129*** (22.51)
CI_t	0.0694*** (8.61)	0.1311*** (6.06)	0.0065*** (3.37)
$TOB_{i,t-1}$*CI_t	−0.0257*** (−17.59)	−0.0300*** (−17.29)	−0.0009* (−1.91)
$PRO_{i,t-1}$	−0.1218*** (−18.27)	−0.1224*** (−18.34)	−0.1300*** (−19.28)
$CAS_{i,t-1}$	0.0719*** (10.39)	0.0716*** (10.35)	0.0759*** (10.89)
$OCF_{i,t-1}$	0.0727*** (12.03)	0.0727*** (12.01)	0.0733*** (11.99)
$LEV_{i,t-1}$	−0.0167*** (−7.49)	−0.0166*** (−7.44)	−0.0147*** (−6.56)
$TAN_{i,t-1}$	0.1070*** (46.97)	0.1070*** (46.97)	0.1067*** (46.40)
$SIZ_{i,t-1}$	0.0002 (0.66)	0.0002 (0.68)	0.0002 (0.79)
$NWC_{i,t-1}$	−0.0721*** (−10.76)	−0.0725*** (−10.81)	−0.0737*** (−10.91)
$DPR_{i,t-1}$	−0.1848*** (−10.55)	−0.1864*** (−10.63)	−0.1847*** (−10.35)
AD	−0.0254* (−1.87)	−0.0158 (−1.33)	−0.0164 (−1.21)
CR	−0.0067** (−2.48)	−0.0110*** (−3.67)	−0.0059** (−2.22)
ID	0.0006*** (8.15)	0.0008*** (8.04)	0.0005*** (8.57)
$Pcre_t$	0.0001*** (3.71)	0.0001*** (4.08)	0.0001*** (4.56)
$Mcap_t$	0.0001*** (6.98)	0.0001*** (6.78)	0.0000*** (6.24)
$Gcap_t$	−0.0035** (−2.44)	−0.0044*** (−3.03)	−0.0062*** (−4.22)
$Infla_t$	−0.0010*** (−5.64)	−0.0009*** (−5.28)	−0.0011*** (−5.97)
Rlaw	0.0102*** (10.15)	0.0107*** (10.59)	0.0073*** (5.87)
Industry dummies	Yes	Yes	Yes
Year dummies	Yes	Yes	Yes
Country dummies	Yes	Yes	Yes
Clustered by firm	Yes	Yes	Yes
R-squared	0.2683	0.2681	0.2623
Number of observations	218,045	218,045	218,045

Note(s): The dependent variable is corporate investment in year t (INV_t). TOB is Tobin's Q. CI is corruption index. PRO is profitability. CAS is cash holdings. OCF is operating cash flow. LEV is financial leverage. TAN is asset tangibility. SIZ is firm size. NWC is net working capital. DPR is dividend payout ratio. AD is shareholder protection index. CR is creditor protection. ID is Hofstede's individualism dimension. Pcre is private credit to GDP. Mcap is market capitalization to GDP. Gcap is annual GDP per capita. $Inlfa_t$ is annual inflation rate in year t. $Rlaw_t$ is rule of law in year t. t-statistics are in parentheses. * is 10% of significance. ** is 5% of significance. *** is 1% of significance

Table 3.
Corruption and corporate investment efficiency

China. These countries contribute approximately 46% of firm years in the research sample. Consequently, our regression results may be driven by them. Panel A of Table 4 shows that all measures of corruption are still negatively related to corporate investment efficiency.

Since investment is measured by total capital expenditure and R&D expenditure in our baseline model, our results may be driven by capital expenditure or R&D expenditure only. Therefore, we replicate all regression models with alternative investment measures, including capital expenditure and R&D expenditure. Our robustness checks in Panel B of Table 4 indicate that our key findings remain unchanged.

Third, we use other regression approaches including weighted least squares regression and Fama and MacBeth (1973) regression. According to Chen *et al.* (2015a), the former is able to mitigate the problem of heteroscedasticity since corporate investment's variance is likely to vary strongly among a group of countries. The weight is defined as the inverse value of investment expenditure's within-country variance. Moreover, although the main tests have

Variables	CI is based on the Corruption Perception Index	CI is based on the Corruption Control Index	CI is based on the International Country Risk Guide
Panel A. Reduced sample without USA, Japan and China			
$TOB_{i,t-1}$	0.0223*** (22.81)	0.0229*** (23.31)	0.0118*** (16.64)
CI_t	0.0581*** (5.77)	−0.0085 (−0.58)	0.0065*** (2.76)
$TOB_{i,t-1}$*CI_t	−0.0272*** (−14.62)	−0.0329*** (−15.52)	−0.0005* (−1.77)
Panel B. Alternative measures of firm investment			
Capital expenditure			
$TOB_{i,t-1}$	0.0043*** (16.89)	0.0043*** (16.37)	0.0035*** (16.87)
CI_t	0.0102** (2.21)	0.0161 (1.45)	0.0032*** (3.39)
$TOB_{i,t-1}$*CI_t	−0.0032*** (−5.00)	−0.0037*** (−5.03)	−0.0008** (−2.27)
R&D expenditure			
$TOB_{i,t-1}$	0.0055*** (12.10)	0.0058*** (12.22)	0.0030*** (9.11)
CI_t	0.0338*** (8.94)	0.0423*** (3.56)	0.0042*** (4.32)
$TOB_{i,t-1}$*CI_t	−0.0078*** (−9.40)	−0.0094*** (−9.61)	−0.0006* (−1.74)
Panel C. Alternative regression approaches			
Weighted least squares regression			
$TOB_{i,t-1}$	0.0198*** (76.68)	0.0199*** (75.98)	0.0115*** (39.93)
CI_t	0.0614*** (10.89)	0.0976*** (8.04)	0.0069*** (4.39)
$TOB_{i,t-1}$*CI_t	−0.0227*** (−39.92)	−0.0258*** (−39.55)	−0.0017*** (−3.14)
Fama–Macbeth regression			
$TOB_{i,t-1}$	0.0218*** (29.62)	0.0225*** (25.16)	0.0134*** (5.96)
CI_t	0.0193* (1.89)	0.0192* (1.91)	0.0014 (0.22)
$TOB_{i,t-1}$*CI_t	−0.0262*** (−14.20)	−0.0307*** (−14.01)	−0.0024* (−1.73)

Note(s): The dependent variable is corporate investment in year t (INV_t). TOB is Tobin's Q. CI is corruption index. t-statistics are in parentheses. * is 10% of significance. ** is 5% of significance. *** is 1% of significance

Table 4.
Robustness checks

many country-level controls, we are still concerned that the research results may be determined by observations from certain years; therefore, we run Fama and MacBeth (1973) regression to control the effects of particular periods. Regression results for alternative approaches in Panel C of Table 4 show that all measures of corruption still negatively affect corporate investment efficiency.

6. The role of shareholder protection

We divide the full sample into two sub-samples of weak and strong shareholder rights in order to investigate how shareholder protection affects the relationship between corruption and investment efficiency. This classification is based on antiself-dealing index of Djankov *et al.* (2008), investor protection index La Porta *et al.* (2006) and legal origin. Antiself-dealing index and investor protection index range from 0 to 1. A country is defined as a strong (weak) shareholder protection if its antiself-dealing index or investor protection index is higher (not higher) than 0.5. Moreover, prior research also finds that most Common law (Civil law) countries are strong (weaker) in shareholder rights (Shao *et al.*, 2013a); therefore, we also consider Common law (Civil law) countries as strong (weak) shareholder protection. Comparing regression results for the two groups, we find that the interaction between Tobin's Q and corruption index is more effective in strong shareholder protection countries. These findings are consistent with the role shareholder protection in mitigating agency problem (La Porta *et al.*, 2000a; Tran, 2020c). Corporate managers in countries of high corruption may take advantage of the flexibility in corporate liquidity policy to expropriate shareholders. However, legal protection of shareholders is effective in controlling this behavior (see Table 5).

Variables	Weak shareholder protection AD ≤ 0.5	Weak shareholder protection IP ≤ 0.5	Strong shareholder protection AD > 0.5	Strong shareholder protection IP > 0.5
Panel A. CI is based on the Corruption Perception Index				
$TOB_{i,t-1}$	0.0197*** (12.17)	0.0218*** (26.27)	0.0217*** (26.20)	0.0205*** (12.82)
CI_t	0.0874*** (7.25)	0.0874*** (7.04)	0.0680*** (4.65)	0.0303** (2.41)
$TOB_{i,t-1}$*CI_t	−0.0238*** (−8.10)	−0.0251*** (−14.44)	−0.0251*** (−14.25)	−0.0260*** (−8.94)
Panel B. CI is based on the Corruption Control Index				
$TOB_{i,t-1}$	0.0196*** (12.70)	0.0199*** (13.19)	0.0227*** (25.43)	0.0228*** (25.48)
CI_t	0.1244*** (3.61)	0.1370** (2.27)	0.0290 (0.00)	0.0360 (1.39)
$TOB_{i,t-1}$*CI_t	−0.0271*** (−8.66)	−0.0284*** (−9.27)	−0.0307*** (−14.21)	−0.0308*** (−14.40)
Panel C. CI is based on the International Country Risk Guide				
$TOB_{i,t-1}$	0.0102*** (9.42)	0.0135*** (20.36)	0.0138*** (20.56)	0.0117*** (10.37)
CI_t	−0.0007 (−0.23)	0.0077*** (3.07)	0.0079*** (3.11)	0.0027 (0.86)
$TOB_{i,t-1}$*CI_t	0.0003 (0.16)	−0.0014 (−1.32)	−0.0018* (−1.68)	−0.0021 (−1.02)

Note(s): The dependent variable is corporate investment in year t (INV_t). TOB is Tobin's Q. CI is corruption index. t-statistics are in parentheses. * is 10% of significance. ** is 5% of significance. *** is 1% of significance

Table 5.
The relationship between corruption and corporate investment efficiency by shareholder protection

7. Conclusion

Corruption is one of the most challenging issues around the world. Many prior studies show that it significantly affects corporate financial decisions; however, there has been no research on the relationship between corruption and investment efficiency. With a sample of 218,350 observations from 30,074 firms across 42 countries, we find that corruption measures are negatively associated with investment efficiency. Our robustness checks with different measures of corporate investment and alternative regression approaches show consistent findings. These understandings indicate that corruption environment also reduces economic efficiency at firm level. Consequently, international investors should choose countries of low corruption when they seek for an investment destination. In addition, this empirical evidence implies that policymakers should enhance their anti-corruption activities in order to improve economic efficiency. Moreover, we also find that the effect of corruption is stronger (weaker) in strong (weak) shareholder protection countries. As a result, policymakers can reduce the effect of corruption environment on corporate investment efficiency by improving shareholder rights. This paper only investigates the country-level corruption on corporate investment efficiency; therefore, further research may focus on the effect of local corruption or bribery payment on corporate investment efficiency.

Notes

1. We also winsorize financial variables at 3 and 5% and our research findings remain stable.
2. ICI captures the spheres of illegal activity as follows: "actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favor-for-favors', secret party funding and suspiciously close ties between politics and business".
3. Shao *et al.* (2013b) posit that individualism dimension is the best proxy for national culture since it prevails in most cultural frameworks and more relevant to risk taking. We also find consistent findings, adding other dimensions including masculinity and uncertainty avoidance.
4. We also conduct a robustness check by adding a period dummy to Equation (1) in order to control the incomparability problem of CPI. The dummy is assigned 1 for observations before 2012 and 0 otherwise. We find that our key findings remain stable.

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Appendix
Rescaling corruption indices

$$\text{CI based on Transparency International's Corruption Perception Index (CPI)} = \begin{cases} 1 - \dfrac{\text{CPI}}{10} & \text{if year} < 2012 \\ 1 - \dfrac{\text{CPI}}{100} & \text{if year} \geq 2012 \end{cases}$$

$$\text{CI based on the World Bank's Corruption Control Index (CCI)} = 5 - \text{CCI*2}$$

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Comparing efficiency in all-inclusive and bed and breakfast hotel businesses: a multi-period data envelopment analysis in Turkey

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Abstract

Purpose – This paper aims to understand the most efficient hotel system and why efficiency varies across years and between the two differing types of hotel businesses in Turkey.

Design/methodology/approach – A data envelopment analysis (DEA) analysis was used to characterise the efficiency of all-inclusive (AI) and bed and breakfast (B&B) hotel businesses with one output (total revenue) and three inputs (labour, food and capital costs). The Malmquist approach is then used to discern changes in total efficiency (TTE) and intertemporal shifts in the efficiency frontier (technological change (Tch)).

Findings – The results reveal that the AI hotel operates at 100% efficiency in the summer and year-round. The B&B hotel business operates at 89.6% with variable constant returns to scale during the summer and with 100% efficiency. The results of the Malmquist approach indicate that the total factor productivity grew in the years 2015, 2016, 2018 and 2019, while the other years were marked by inefficiency. Such increases were due to technical efficiency change (TEch) and Tch, which means that managerial and allocative efficiency (AE) were barely achieved. Slight differences were noted in the two time periods (all year and summer), suggesting that the scale of hotel businesses is prepared to operate all year round, and this calls for strategies to mitigate seasonality.

Research limitations/implications – As to avenues for future research, the limitations of this study are threefold. First, the hotel businesses are not parallel in terms of the duration of their service offerings. Future research may consider including an AI hotel business that is in operation for the whole year. Second, businesses in Turkey are sceptical about sharing their data as it is considered confidential. However, to better generalise the results and encourage hoteliers to consider the positive outcomes of such analysis, the number of observations could be increased by considering more hotel businesses in both categories. Third, a mixture of data representing businesses operating in various countries may reflect if the efficiency scores vary internationally.

Practical implications – Overall, AI hotel businesses are more attractive but less efficient than B&B. Furthermore, the external crisis impacts the efficiency of hotel businesses meaning that hotel managers could keep on exploring AI, perhaps educating their hosts not to waste or not offer huge quantities. Hotel managers may also need to enlarge their seasonal activities to ensure more efficiency.

Social implications – Despite the intentions of AI hotel businesses to increase their profitability with a lower level of service quality, this study shows that the AI hotel business is very attractive but not so efficient due to the higher propensity of guests to consume food and beverages in excess that compromises the definition of efficiency as zero waste. AI is very attractive for family groups or those seeking the pleasure of relaxation at

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seaside resorts and is also very popular in Turkey. On the other hand, the B&B hotel business is more efficient but less attractive.

Originality/value – The contributions of this paper are threefold. First, the authors analysed the efficiency and inefficiency of hotel businesses within nine years of operations. During this period, Turkey experienced first a tourism boom (2011–2014) followed by stagnation and subsequently a sharp decline due to political instability resulting in an (in)direct impact on tourism (2015–2019). Second, the authors compared the efficiency and inefficiency of AI and B&B hotel businesses. Third, the authors examined the effects of hotel management factors to ensure efficiency.

Keywords Turkey, City hotels, Hotel efficiency, Data envelopment analysis, Resort hotels

Paper type Research paper

Introduction

Over the last two decades, there has been an increasing number of studies evaluating the performance of hotel businesses by applying efficiency measures that are dependent upon the consideration of multiple inputs and multiple outputs (Assaf *et al*., 2012; Chen, 2019; Chiang *et al*., 2004; Hwang and Chang, 2003; Tsaur, 2011). Efficiency is critical for the administration of hotel businesses as they compete in an oligopolistic market where prices and costs are the key drivers to succeed (Barros, 2004). Given these calls for efficiency, it is of considerable interest to examine how hotel businesses could respond to the increased pressure. Data envelopment analysis (DEA) allows measuring the variation in efficiency between hotel businesses and in the time frame. Furthermore, this technique allows the identification of the possible sources of inefficiency.

The standard DEA approach has the disadvantage that it cannot distinguish between changes in relative efficiency brought about by movements along or down the efficiency frontier each year (Hadley, 2006). Malmquist indices are computed to capture these two sources of change in efficiency (Maniadakis and Thanassoulis, 2004). Studies about efficiency in hotel businesses rely primarily on stochastic frontiers (Barros, 2004; Chen, 2007; Dapeng *et al*., 2020), usually only for one year (Oukil *et al*., 2016) or for several years but using the same types of hotel businesses (e.g. Assaf *et al*., 2012; Barros and Dieke, 2008; Chiang, 2006; Hsieh and Lin, 2010; Pulina *et al*., 2010).

The geographical profile of existing studies also represents the hospitality industry in such countries as China (Dapeng *et al*., 2020), France (Perrigot *et al*., 2009), Italy (Pulina *et al*., 2010), Singapore (Ashrafi *et al*., 2013), Slovenia (Assaf *et al*., 2012), Portugal (Amado *et al*., 2017), Taiwan (Chen, 2019; Chiang *et al*., 2004) and Tunisia (Aissa and Goaied, 2016), among others. Also, the representation of the Turkish hospitality industry and the comparison of different forms of hotel businesses in efficiency studies have been overlooked in the international literature.

Unlike the previous studies carried out with a homogeneous sample of hotel businesses (e.g. Assaf *et al*., 2012), to our best knowledge, this is among the first studies differentiating all-inclusive (AI) and bed and breakfast (B&B) hotel businesses despite the comparison of city/chain and resort/AI hotel businesses previously (Aissa and Goaied, 2016; Yu and Lee, 2009). This study also aims to examine trends in efficiency over time with the main causal factors, dismantling the efficiency differences in AI and B&B hotel businesses for 2011–2019. The first research question is R1, and the second research question is R2:

R1. Whether hotel efficiency was impaired by the exceptional downturn in tourist arrivals.

R2. Whether AI hotel businesses are less or more efficient than their B&B counterparts.

Efficiency in hotel businesses

The microeconomic theory states that producers aim to maximise their profits. They have to choose the most efficient combination of resources (allocative efficiency (AE)) that defines the

optimal level of production (technical efficiency (TE)) with minimal costs. The DEA model measures technical and AE (Varian, 2014). As such, TE is the maximum production that the organisation can reach considering its production function, whereas AE is the best combination of resources which the organisation can reach, given the prices of the inputs (Varian, 2014). Therefore, the total efficiency (TTE) is the product of allocative and TE. A DEA estimate based on outputs allows an understanding of how marginal increases in outputs (or quantity produced) is a source of inefficiency. Although it is possible to estimate DEA through an input orientation that measures technical inefficiency as the marginal decrease in input usage, this study adopts an output orientation to consider the shifts that the tourism demand has suffered over the last decade.

Traditionally, the production functions of hotel businesses are considered a Cobb Douglas function; this configuration allows constant or variable returns to scale. Return to scale refers to the rate of increase in output with the increase in inputs. In other words, returns to scale measure how much the output will increase if the utilisation of inputs increases. Constant returns to scale mean that the output increases by the same proportion of the increase of the inputs used. In contrast, variable returns to scale mean that output could increase by less (decreasing returns to scale) or by more (increasing returns to scale) than the proportion of the increase of utilisation of the inputs. Returns to scale are mainly related to TE (Varian, 2014).

To better utilise how the inputs are effectively used to produce outcomes, understanding the efficiency of operations in various aspects is critical to defining business strategies and enhancing competitiveness (Honma and Hu, 2012; Qi and Junhai, 2011). At the competitive level, efficiency is measured to compare competitors, and at the business strategy level, efficiency is measured to control performance (Chen, 2006). The primary purpose of any business is to maximise the number of revenues subject to constraints on quantities and prices. Efficiency happens when businesses reach the maximum level of revenues while maintaining minimal costs or an optimal combination of inputs (Lovell, 1993). As a result, cost control has become an essential dimension of efficiency for hotel businesses (Qi and Junhai, 2011).

From the perspective of a hotel business, efficiency models have been used to identify efficiency as well as sources of inefficiency that may contribute to defining strategies to reduce cost inefficiencies through a benchmarking assessment (Anderson *et al.*, 1999; Barros, 2004; Chen, 2006; Morey and Dittman, 1995). Businesses are inefficient when they fail to allocate resources most efficiently, AE, or when they fail to utilise resources efficiently, technical inefficiency (Anderson *et al.*, 2000).

Debreu (1951), Koopmans (1951) and Leibenstein (1966) were the first researchers to define inefficiency as the curve difference between the potential and the actual utilisation of resources. The curve of the potential use of resources that maximises the output or the revenue is defined as the efficiency frontier. This frontier has been estimated through different methods, the most usual being the stochastic frontiers approach (SFA) (Assaf, 2012; Chen, 2007; Barros, 2004) or DEA (Hwang and Chang, 2003; Barros, 2006). Furthermore, Honma and Hu (2012) analyse hotel efficiencies using SFA and DEA to conclude that the results are consistent. Both methods assume that the production function in the most efficient combination of resources is known. Furthermore, Hjalmarsson *et al.* (1996) argue that despite some consistency within the results, DEA and DFA are less demanding as these models do not require distribution assumptions about efficiency. Further, DEA generates a range of optimal scales; SFA relies on a constant level of optimal scales and yields a constant return to scale.

Also, SFA is based on econometric models and is much more demanding in terms of data. DEA involves mathematical programming but is less demanding in terms of data (Barros and Santos, 2006). On top of that, DEA allows several inputs and outputs to be introduced without functional data restrictions or distributional assumptions for inefficiency (Barros and Santos, 2006). It also allows the efficient frontier to be estimated from the sample data, as is the case in this study.

There are several studies in the hotel industry adopting DEA to measure the efficiency of hotel businesses (Tsaur, 2001; Chiang *et al.*, 2004; Hwang and Chang, 2003). A quick overview of the existing literature indicates a long list of variables used as inputs and outputs: input variables include annual revenues, number of customers, number of nights and occupancy rates. The input variables are represented by the number of beds, number of rooms, number of employees, labour costs (Assaf *et al.*, 2012; Chiang *et al.*, 2004), marketing and/or advertising costs (e.g. Huang *et al.*, 2014; Polemis *et al.*, 2020), and management styles (Yu and Lee, 2009), star rating and location (Oliveira *et al.*, 2013) and destination characteristics (Benito *et al.*, 2014; Sellers-Rubio and Casado-Díaz, 2018).

Furthermore, there has been a growing interest in comparing efficiency across hotel businesses in different categories such as franchised, managed-contract or independently operated (e.g. Assaf, 2012; Chiang *et al.*, 2004; Perrigot *et al.*, 2009). DEA has been primarily used to make a bilateral comparison across two units of hotel businesses, such as chains and independent operations (Botti *et al.*, 2009). The results of such studies suggest a better efficiency of franchised, managed-contract or chains than those independently operated by the owners (e.g. Aissa and Goaied, 2016; Chen, 2019; Chiang *et al.*, 2004) due to the advantage of economies of scale, professionalism in good managerial practices, strong brand recognition and know-how skills (Perrigot *et al.*, 2009).

Despite several exceptions in environmental performance (e.g. Assaf *et al.*, 2012; Chen, 2019) or regional performance (e.g. Assaf, 2012; Pulina *et al.*, 2010) and the influence of privatisation (e.g. Amado *et al.*, 2017), the existing body of research has been dominant in measuring the efficiency of hotel businesses with the calculation of their inputs (costs) and outputs (revenues), as indicated above. As a result, the current study is also a continuation of using a similar approach but in a different context of locations (city-resort) and service concepts (B&B-AI). Furthermore, the previous literature estimates efficiency indirectly as most variables relate to the market performance rather than the optimal allocation of resources. Because this is the case of labour and capital, this study also recovers the original concept of efficiency.

The output variable was sales in line with the models previously used (e.g. Chiang *et al.*, 2004). In contrast, the three inputs include labour costs, food and beverage costs, and capital costs, given the prices of the inputs considered. *Annual revenues* refer to all income sources generated within the hotel facility (Huang *et al.*, 2012; Neves and Lourenço, 2009; Pulina *et al.*, 2010). *Labour costs* indicate what has been paid as the salary, insurance, food and housing (Brida *et al.*, 2012; Detotto *et al.*, 2014). *Food and beverage costs* are calculated by the amount of all expenses required to serve food and beverage at the hotel facilities (Assaf and Agbola, 2011). *Capital costs* represent the cost of technology, equipment and infrastructure (Guccio *et al.*, 2017; Solana-Ibáñez *et al.*, 2016). The models estimated TE and AE efficiency. Labour and capital are the most traditional and standard variables to define the frontier of efficiency in any hotel business; food costs in a hotel context are not as usual but are critical, particularly in the context of AI resort hotel businesses.

Background of the Turkish tourism industry

The historical background of tourism development in Turkey dates back to the 1950s. As the first international chain and five-star hotel business, the Hilton Istanbul started welcoming visitors in 1955. This was followed by other chains and larger capacity hotel businesses in the subsequent decades. Commencing in the 1980s, the government decided to financially support the development of summer tourism by establishing resorts with larger capacities on the Aegean and Mediterranean coasts of Turkey. In the 1990s, the government discontinued subsidising as those facilities reached their saturation point, leading to the diversification of tourism types and the establishment of small-scale facilities being encouraged. As a joint

force of both public and private sectors, the Turkish tourism industry has recorded remarkable progress over the last five decades. As a result, with its more powerful position in international tourism, Turkey was among the top 10 destinations until early 2020.

As in all countries, Turkey has also been adversely affected by the spread of the pandemic, leading to a dramatic decrease in the arrival of international visitors by 75% leading to a loss of tourism income by 70%. With its annual base of 31%, the national hospitality industry recorded a much lower occupancy rate in 2020. In terms of its attractiveness and formation of significant tourism products dominated mainly by culture, nature and sports, the Turkish hospitality industry has been formed by a more substantial contribution from its three major destinations: Istanbul, Antalya and Mugla.

As one of the most robust destinations both in domestic and international tourism, Bodrum, a part of Mugla, is located on the Aegean coast of Turkey. Its tourism movements started in the 1970s. With the opening of Bodrum Airport (BJV, 1998), additional flights and tourist movements boomed in Bodrum. In 2015, the best year for the region, one million inbound tourists flew into Bodrum. However, the occupancy rate sharply decreased in the following years due to the consequences of terrorism (1999), the Russian plane crisis (2015), the coup attempt of 15 July (2016) and the Bodrum earthquake (2017). The common point of these crises is that they occurred in Turkey but directly influenced the progress of tourism development, specifically in Bodrum.

Currently, Bodrum has 147,000 permanent residents, but with the arrival of tourists and summer houses, this adds up to 600,000 in the summer season. It accommodates 68 five-star hotel businesses, with a total bed capacity of 110,000. There are 90 hotel businesses offering AI services. The tourism season usually opens in the middle of April and lasts until October. Bodrum welcomes inbound tourists primarily from the UK, Russia, Poland, Ukraine, the Netherlands, Belgium, France, Germany and Denmark. While there was a stable upward trend until 2015, it experienced a sharp decline in 2016 due to the political crisis between Turkey and Russia and the attempted coup on 15 July 2016. It maintained a welcome for 940,000 international tourists in 2019, but a sharp decline to 233,000 was recorded in 2020, arriving only via airlines. The domestic market also makes a significant contribution. Over the last ten years, there has been a similar pattern for Turkey in general and Bodrum specifically (Figure 1).

As a partner destination of this study, the population of Istanbul is over 20 million and houses 134 five-star hotel businesses. They mainly cater for B&B accommodation, and the

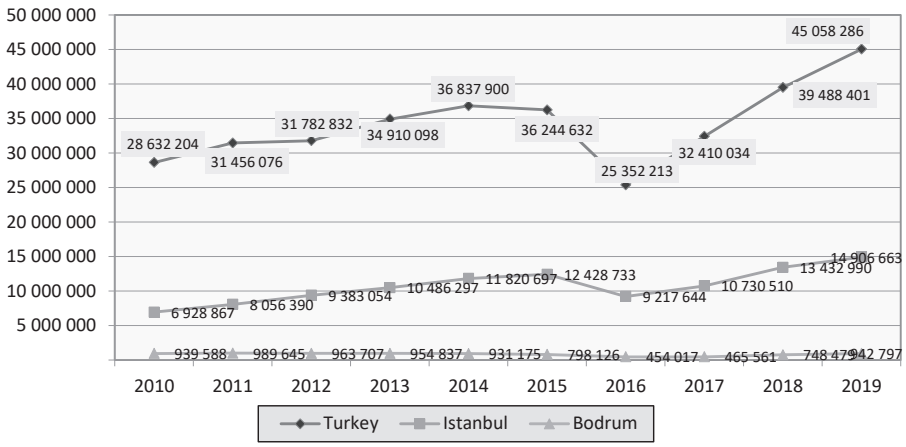

Figure 1.
The number of inbound tourists to Turkey, Istanbul and Bodrum (2010–2019)

duration of stay per visitor is lower than that in Bodrum. Istanbul is also one of the strong brands in attracting visitors to MICE tourism. In 2019, it attracted approximately 15 million inbound tourists, primarily from France, Germany, Iran, the Netherlands, Russia, the UK and the US. As indicated in Figure 1, the pattern of tourist arrivals has also been unstable for Istanbul over the last ten years.

The classification of hospitality facilities in Turkey is officially based on 1–5 stars, first- and 2nd class resorts, and those graded by the local municipalities. This study refers to the performance analysis of two five-star hotel facilities operating in Bodrum and Istanbul. The one in Bodrum started its operations in 2004. It is a five-star establishment with 200 employees, 251 rooms and 550 beds and offers an AI concept. As known, AI is a complete concept offering various services such as food, beverage, pool and animation at a single price. Some hoteliers offer those services from early in the morning until late at night, whereas others are open 24/7. The concept is successful in attracting mainly family groups with kids. The structure of hotel guests is mainly represented by those coming from the UK, Poland, Russia, Ukraine, the Netherlands, Scandinavia and Turkey. The hotel business usually opens its doors for a new season, effective from mid-April to the end of October.

With its first operation in 2007, the hotel in Istanbul is a five-star establishment offering only the B&B concept. B&B offers only accommodation and breakfast at a single price. It has a capacity of 335 rooms and 670 beds with an average of 140 employees. It is open for the whole year. Its target market is those visitors who visit the city primarily for sightseeing, history, art, fashion, shopping, culture and business. This is a common form of city hotel around the world.

Conceptual framework and methods

DEA incorporates multiple input and output variables, leading to a single efficiency index (Assaf *et al.*, 2012). The most efficient units are considered the best practice frontier. The efficiency score ranges between zero (minimum efficiency) and one (maximum efficiency). As this study aims to understand the efficiency of AI and B&B hotel businesses, two DEA models were estimated. The first with variable returns to scale was estimated for the whole year's operations and the second for the summer (May–October). This study departs from a data set obtained from the two hotel businesses in Turkey with different service concepts (AI and B&B) in nine years (18 observations) from 2011 to 2019, with one output and three inputs.

Based on the above arguments, this study considers the annual revenues as the output variable. In contrast, the three inputs include labour costs, food and beverage costs, and capital costs, given the prices of the inputs considered. The models estimated TE and AE efficiency. Labour and capital are the most traditional variables to define the frontier of efficiency; food costs in hotel contexts are not as usual but are critical for the performance of particularly AI resort hotel businesses (see Figure 2).

Furthermore, efficiency was analysed over time to understand how and why productivity changes over the years. Between 2011 and 2012, a significant decline was observed in inefficiency. Accordingly, Örkcü *et al.* (2016) tested productivity and efficiency in airports in Turkey from the period of 2009 to 2014 with the Malmquist index to conclude that whilst productivity increases, efficiency decreases.

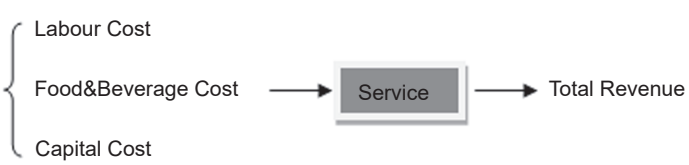

Figure 2.
DEA model used to evaluate the efficiency of AI and B&B hotels

This analysis was performed by calculating the Malmquist productivity index (MPI), which analyses the causes that generate productivity changes over time (Caves *et al.*, 1982). The MPI measures total factor productivity by comparing two time periods with rations of distance functions. This index does not need prior assumptions on the production technology or output data (Coelli, 1996).

This index can be broken down into technical efficiency change (TEch) and technological change (Tch). Technical efficiency is determined by the position of a concrete production relative to (the efficient subset of) and the technological frontier (TEch). It is quantified as a standardised distance between this production and its Pareto–Koopmans optimal possibility marked by the absence of waste in physical terms (Tone, 2004). Furthermore, TEch can be broken down into pure technical efficiency change (PTE) and scale efficiency change (SE). TEch results from improvements in the combination of inputs to achieve output. Technical efficiency is measured along the production possibility frontier, while inefficiency is measured in points below the curve.

However, over time, the level of outputs an organisation can produce will increase, primarily because of Tch that impact the ability to combine inputs to achieve a higher level of outputs. This causes the production possibility frontier to move upward. In other words, TEch accounts for TE gains, and Tch accounts for technological improvements. PTE measures managers' ability to combine inputs in the most efficient way to achieve a certain level of production. SE measures the contribution of scale efficiency to productivity growth (Tone, 2004).

This study calculates DEA frontiers to estimate technical efficiencies and Malmquist TFP indices to estimate total factor productivity changes (TFPch) in AI and B&B hotel businesses between 2011 and 2019. These procedures were adopted with the free software DEAP (DEA (computer) program) developed by the University of Queensland by Coelli (https://economics.uq.edu.au/cepa/software) (Coelli, 1996).

Results

Technical, allocative and economic efficiency for both hotel businesses and the years 2011–2019, with constant and variable returns to scale, are presented in Table 1. With VRS, both hotel businesses presented TE, but AE is above the mean in the B&B hotel business when the operation covers only the summer. This means that the B&B hotel business does not have the best management policies to achieve 100% TE, but in the case of the AI hotel business in Bodrum, the efficiency is 100%. This result suggests that efficiency in B&B hotel businesses is a matter of operating all the year. These results are in accordance with Barros and Santos (2006). Due to the political instability, the Malmquist TFT index was calculated in the time frame under analysis. Five indicators are presented in Table 2, all relative to the previous year: TEch, Tch, PTE, SE and TFPch.

Hotel	TE	AE	EE
B&B Hotel	0.896	1	0.896
AI Hotel	1	1	1
Mean	0.948	1	0.948
Summer			
Hotel	TE	AE	EE
B&B Hotel	1	1	1
AI Hotel	1	1	1
Mean	1	1	1
All the year			

Table 1. Technical, allocative and economic efficiency (2015–2019)

DEA all year round	Technical efficiency change (TEch)	Technological change (Tch)	Pure technical efficiency change (PTE)	Scale efficiency change (SE)	Total factor productivity change (TFPch)
2012/2011					
B&B	1	0.977	1	1	0.977
Hotel					
AI	1	0.998	1	1	0.998
Hotel					
Mean	1	0.987	1	1	0.987
2013/2012					
B&B	1	0.802	1	1	0.802
Hotel					
AI	1	0.891	1	1	0.891
Hotel					
Mean	1	0.845	1	1	0.845
2014/2013					
B&B	0.769	1.029	1	0.769	0.791
Hotel					
AI	1	1.074	1	1	1.074
Hotel					
Mean	0.877	1.051	1	0.877	0.922
2015/2014					
B&B	1.265	1.105	1	1.265	1.367
Hotel					
AI	1	1.066	1	1	1.066
Hotel					
Mean	1.125	1.085	1	1.125	1.22
2016/2015					
B&B	0.933	0.696	1	0.933	0.649
Hotel					
AI	1	2.035	1	1	2.035
Hotel					
Mean	0.966	1.19	1	0.966	1.149
2017/2016					
B&B	1.103	1.007	1	1.103	1.11
Hotel					
AI	1	0.593	1	1	0.593
Hotel					
Mean	1.05	0.772	1	1.05	0.811
2018/2017					
B&B	1	1.094	1	1	1.094
Hotel					
AI	1	1.041	1	1	1.041
Hotel					
Mean	1	1.067	1	1	1.067
2019/2018					
B&B	1	1.115	1	1	1.115
Hotel					
AI	1	0.926	1	1	0.926
Hotel					
Mean	1	1.016	1	1	1.016

Table 2.
Malmquist total factor productivity changes

(*continued*)

DEA all year round	Technical efficiency change (TEch)	Technological change (Tch)	Pure technical efficiency change (PTE)	Scale efficiency change (SE)	Total factor productivity change (TFPch)
Means by hotel					
B&B Hotel	1	0.966	1	1	0.966
AI Hotel	1	1.021	1	1	1.021
Mean	1	0.993	1	1	0.993

Table 2.

As indicated in Table 2, both hotel businesses presented inefficiency between 2011 and 2013, mainly because Tchs were not efficient. In 2014, the B&B benefited from a shift in technology, but its TE was not the best (0.769). On the contrary, AI presents a TE of 100% and a Tch of 1.074. In 2015, both presented productivities above 100%, with the B&B being the more efficient (1.367). This gain comes from a shift in the scale of the hotel business and a better allocation of resources. 2016 was the best year for the AI hotel business, which doubled its productivity, whereas the B&B hotel business lost productivity, going down to 0.649, primarily due to a decrease in Tchs. This may be due to out-date operational equipment. In 2017, the AI hotel business lost almost half of its productivity, whereas B&B recovered by 11%. 2018 was a good year for both hotel businesses, even if the B&B business was more efficient. The rapid devaluation of the Turkish Lira against the Euro might have been a significant factor in this respect because the Turkish tourism industry uses Euros for sales but make payments in Turkish Lira, resulting in a decrease in total expenses. In 2019, the AI decreased its productivity, whereas the B&B was kept with efficient patterns. The volatility of the results could be explained by the shifts in the demand and the lack of investments, and more efficient management of the resources.

Overall, the AI hotel business presents a better performance with efficiency gains of 21% due to Tchs. These results may be related to the scale of the hotels. In order to understand the implications of the operating timeline, Malmquist DEA was estimated considering only the summer period from May to October (Table 3). The results are very similar, with a slight loss in productivity primarily noted in the AI hotel business. As gains and losses in productivity are primarily due to Tch, we may assume that the gains are related to experience economies. This means that production increases only due to hotel businesses' expertise over the years. These results suggest that investments to improve productivity remained deficient, while other managerial policies to improve productivity do not change efficiency.

Furthermore, productivity increases very little over the nine years. Perhaps because of the country's political instability or possibly because the hotel businesses under investigation did not change the standards of their operations, it seems that the AI is more efficient than the B&B hotel business. As the summer benefits from a slight increase in productivity, strategies to mitigate the seasonality should be undertaken.

These results also suggest that the productivity of hotel businesses depends on market volatility, and productivity increases could only happen if the hotel business can improve its technical procedures. Managerial efficiency is stable, as it is TE and scale efficiency, which is not surprising as the number of rooms has been fixed over the years. Overall, the results suggest that AI benefits from operating all year with a gain in productivity of 21%. In contrast, the B&B seems to benefit from operating only in the summer, even if its productivity is above 100%.

	Technical efficiency change (TEch)	Technological change (Tch)	Pure technical efficiency change (PTE)	Scale efficiency change (SE)	Total factor productivity change (TFPch)
2012/2011					
B&B Hotel	1.116	0.886	1	1.116	0.989
AI Hotel	1	0.974	1	1	0.974
Mean	1.056	0.929	1	1.056	0.981
2013/2012					
B&B Hotel	0.942	0.833	1	0.942	0.785
AI Hotel	1	0.886	1	1	0.886
Mean	0.971	0.859	1	0.971	0.834
2014/2013					
B&B Hotel	0.722	1.079	1	0.722	0.779
AI Hotel	1	1.061	1	1	1.061
Mean	0.85	1.07	1	0.85	0.909
2015/2014					
B&B Hotel	1.323	1.106	1	1.323	1.463
AI Hotel	1	1.067	1	1	1.067
Mean	1.15	1.087	1	1.15	1.25
2016/2015					
B&B Hotel	0.835	0.692	1	0.835	0.578
AI Hotel	1	1.208	1	1	1.208
Mean	0.914	0.914	1	0.914	0.835
2017/2016					
B&B Hotel	1.331	0.949	1	1.331	1.263
AI Hotel	1	0.918	1	1	0.918
Mean	1.154	0.933	1	1.154	1.077
2018/2017					
B&B Hotel	1	1.172	1	1	1.172
AI Hotel	1	1.046	1	1	1.046
Mean	1	1.107	1	1	1.107
2019/2018					
B&B Hotel	1	1.084	1	1	1.084
AI Hotel	1	0.952	1	1	0.952
Mean	1	1.016	1	1	1.016
Means by hotel					
B&B Hotel	1.014	0.962	1	1.014	0.975
AI Hotel	1	1.01	1	1	1.01
Mean	1.007	0.986	1	1.007	0.992

Table 3.
DEA summer operating period

Conclusion and implications

This paper investigated the efficiency of hotel businesses in two different categories. Specifically, it considered how labour costs, food and beverage and capital had influenced the efficiency of both AI and B&B hotel businesses in terms of the volume of sales, both operating in Turkey. The contributions of this paper are threefold. First, we analysed the efficiency and inefficiency of hotel businesses within nine years of operations. During this period, Turkey experienced first a tourism boom (2011–2014) followed by stagnation and subsequently a sharp decline due to political instability resulting in an (in)direct impact on tourism (2015–2019). Second, we compared the efficiency and inefficiency of AI and B&B hotel businesses. Third, we examined the effects of hotel management factors to ensure efficiency.

Despite the intentions of AI hotel businesses to increase their profitability with a lower level of service quality (Aissa and Goaied, 2016), this study shows that the AI hotel business is very attractive but not so efficient due to the higher propensity of guests to consume food and beverages in excess that compromises the definition of efficiency as zero waste. This finding corresponds to what has been suggested by Aissa and Goaied (2016). AI is very attractive for family groups or those seeking the pleasure of relaxation at seaside resorts and is also very popular in Turkey. On the other hand, the B&B hotel business is more efficient but less attractive. This finding is in accordance with earlier studies suggesting that the franchised, managed-contract or chain hotel businesses perform better than those independently operated by the owners (e.g. Aissa and Goaied, 2016; Chen, 2019; Chiang *et al.*, 2004; Perrigot *et al.*, 2009) due to the strengths of the former in good management practices and brand reputation.

Today, tourists are more drawn to accommodation with safety and security measures, so AI may constitute tourism's most demanding concept if a new approach to catering is adopted. For instance, radical changes in the design of open buffets by reducing the food items or avoiding self-service are expected to positively influence customers' feelings of trust (Hameed *et al.*, 2020). However, it may increase labour costs and lead to dissatisfaction among hotel guests with limited service offerings. AI hotels are more resistant to crises than BB hotels and more manageable for a recovery. There is a possibility of reducing the number of unsatisfied guests and decreasing the food cost per guest by redesigning cooking plans and recipes.

As to the implications for the industry, first, there can be an elasticity problem for hotel businesses during a crisis due to the strict brand rules that may cost extra. As highlighted above, BB hotels are efficient but less attractive due to low overnight per room 1.3 night/room. This may increase the cost of the room department, such as the daily room cleaning, new linens and staff. AI hotels are not efficient but more attractive due to high overnight stay per room – 9.6 nights/room. Thus, the cost of daily room operations will be less at any level compared to BB hotels.

Second, between 2015 and 2019, the Turkish tourism industry suffered from political instability, with significant drawbacks in tourist arrivals and overnights, ultimately impacting the efficiency of hotel businesses, regardless of their size, location or concept. The number of tourist arrivals was not stable, with a significant drop from 36 million (2015) to 25 million (2016); a restoration was starting with an increase to 39 million (2019). Furthermore, with a loss of international visitors by 73%, the influence of the current pandemic situation on the tourism industry is likely to raise how AI hotel businesses could maintain this concept without compromising business efficiency.

Third, overall, AI hotel businesses are more attractive but less efficient than B&B. Furthermore, the external crisis impacts the efficiency of hotel businesses meaning that hotel managers could keep on exploring AI, perhaps educating their hosts not to waste or not offer enormous quantities. Hotel managers may also need to enlarge their seasonal activities to ensure more efficiency. Food should be produced in smaller portions but with more variety and freshness. Cooking may be demonstrated on the front line so that guests can feel and see the activity. During the off-season periods, AI hotel businesses may reduce the number of

paid staff and other operational and fixed costs. These hotels should reach an optimum number of room sales to be profitable due to high costs and busy operations.

As to avenues for future research, the limitations of this study are threefold. First, the hotel businesses are not parallel in terms of the duration of their service offerings. Future research may consider including an AI hotel business that is in operation for the whole year. Second, businesses in Turkey are sceptical about sharing their data as it is considered confidential. However, to better generalise the results and encourage hoteliers to consider the positive outcomes of such analysis, the number of observations could be increased by considering more hotel businesses in both categories. Third, a mixture of data representing businesses operating in various countries may reflect if the efficiency scores vary internationally. Last but not least, the impact of the crisis as it was the pandemic coronavirus disease 2019 (COVID-19) should be analysed in light of efficiency theory.

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Earnings management by health insurance companies in Brazil

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Abstract

Purpose – This study examines whether Brazilian health insurance companies (HICs) engage in earnings management through discretionary accruals or operational decisions by refraining from reporting a low indicator of sustainability in the market (IDSM).

Design/methodology/approach – The study used the Jones and Modified Jones models to identify earnings management through discretionary accruals and used the model described by Roychowdhury to estimate the abnormal behaviors of operational decisions. Data covering 2012 to 2018 were collected from the ANS website.

Findings – The results show that HICs engaged in earnings management to avoid reporting a low IDSM. The findings should help health insurance clients make decisions regarding the purchase or change of health insurance. The findings should also encourage regulators to improve their evaluation of the economic and financial risks around HICs.

Originality/value – The National Agency of Supplementary Health (ANS) established a qualification program for HICs, monitoring them based on a set of indicators. Managers may have an incentive to use earnings management to obtain indices that meet the requirements of the ANS qualification program in order to avoid showing signs of abnormality.

Keywords Health insurance company, Abnormality, Earnings management, Abnormal behavior, Operational decision

Paper type Research paper

1. Introduction

Health insurance companies (HICs) in Brazil are regulated by the Agência Nacional de Saúde Suplementar (National Agency of Supplementary Health; ANS), which operates under the umbrella of the Ministry of Health. The agency was established by Law 9961/2000 and serves to regulate, standardize, control and supervise activities related to supplementary health (Cardoso, 2005; Guimarães and Alves, 2009). The ANS runs a qualification program for service providers. The program includes an evaluation system based on the Indice de Desempenho de Saúde Suplementar (Supplementary Health Performance Index; IDSS). The index's indicators are aggregated into four dimensions: quality in health care, guarantee of access, sustainability in the market, and process and regulatory management. The last indicator is based on an evaluation of how quality in the sector is being enhanced according to the ANS.

The ANS has also measured performance using the Indicador da Dimensão Econômic-Financieira (Indicator of the Economic and Financial Dimension; IDEF) and the Indicador da Dimensão de Sustentabilidade no Mercado (Indicator of Sustainability in the Market; IDSM);

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the latter replaced the former after the reformulation of the qualification program in 2015. It monitors HIC sustainability, verifying the firm's economic and financial stability, as well as its ability to fulfill its obligations. The results are calculated based on a set of indicators: net assets and current liquidity, the provision for events incurred but not reported, sufficient guarantee assets, own resources, financial availability, inspection rate, and rate of resolution of preliminary intermediation notifications.

The ANS uses the qualification program to promote quality, comparability and competition in the sector. The program reports the overall performance of HICs and thus increases transparency and allows the firms' beneficiaries to make informed choices of service provider (ANS, 2017a). According to Pinheiro *et al.* (2015), the issuance of the ANS provisions related to economic and financial factors has forced HICs to improve their management.

However, Mensah *et al.* (1994) suggest that, despite the regulatory supervision, managers in this industry conduct earnings management to achieve specific goals. Greenwood *et al.* (2017) provide econometric evidence that earnings management is used to avoid regulatory intervention when firm performance is just below or well above the intervention threshold.

Managers may use earnings management due to various incentives (Dechow *et al.*, 2010), such as to hide administrative abnormalities, satisfy the indicators used by the ANS qualification program (e.g. net assets, liquidity, provision for events incurred but not reported, sufficient guarantee assets, own resources and financial availability), and to improve their IDSS ranking, which consumers can use when choosing their health insurance company. Thus, this study seeks to determine whether Brazilian HICs use earnings management to avoid reporting a low IDSM, particularly through discretionary accruals and operational decisions.

Several important Brazil-focused studies have examined this issue. For example, Cardoso (2005) verified the impact of health insurance regulation on incentives to choose accounting practices using data from 2001 to 2003. Guimarães and Alves (2009) tested a prediction model for estimating the probability of insolvency, and Ferreira *et al.* (2011) examined whether external audit minimizes the propensity to engage in earnings management. Sancovschi *et al.* (2014) examined the relationship between HICs' IDSS ranking and their likelihood of being subject to special regimes. Pinheiro *et al.* (2015) analyzed the dynamics of financing strategies, pointing to the need for more comprehensive analyses of HICs. Bragança *et al.* (2019) argued that more studies are necessary on HICs in Brazil and other countries, especially regarding their solvency and sustainability.

None of the abovementioned studies discussed performance indicators (e.g. IDEF, IDSM) or their relationship to earnings management. To address this lacuna, this study offers original empirical evidence drawn from Brazil of the association between earnings management and the ANS sustainability indicators, providing clear evidence that companies manage earnings in order to increase them, which impedes the agency's ability to perceive risks.

This study contributes to the literature on the supplementary health market in Brazil, which, according to the ANS, was worth approximately R$179 billion and served approximately 24% of the Brazilian population. We seek to demonstrate the existence of earnings management in this sector by discussing the incentives for manipulating accounting information. The study highlights the risks to sector regulators and calls for improvements in the tools used to monitor HICs. It also seeks to help HIC users choose health insurance firms and to encourage regulators to improve their assessment of the economic and financial risks of HICs.

The study used data available on the ANS website based on yearly reports of registered HICs active from 2012 to 2018. The sample comprised data for all HICs that had sent complete information to the ANS during the study period. A total of 1,362 companies were included, providing 7,549 observations.

The next section presents theoretical background for the study. Then, we discuss the study's methodology. Next, we present our results. Finally, the study concludes with a critical assessment of the results.

2. Theoretical framework

The ANS regulations establish the conditions for ensuring the performance of private health agents such as HICs and meeting global criteria of economic and social sustainability in order to protect the public interest (Silva *et al.*, 2000; Pinheiro *et al.*, 2015). Cardoso (2005) claims that some markets feature only a small number of companies, and some services are monopolized. The author emphasizes that consumers lack access to complete information, creating significant information asymmetry regarding the firms' economic and financial situations. Cardoso (2005) also highlights the role of the state in minimizing market failure.

Campos and Camacho (2014) conducted market structure analyses and identified the existence of inefficiencies that generated a social cost and that called for public policies aimed at promoting efficiency and regulations aimed at preventing failures and universalizing products and services. Therefore, the Brazilian government created executive agencies in areas of social interest, such as sanitary control and supplementary health. According to Pinheiro *et al.* (2015), the supplementary health sector faces higher risk, since it is not possible to predict future expenses in the health services, even though the HIC is in a positive financial cycle due to the anticipated level of monthly fees.

The Instituto de Estudos de Saúde Suplementar (Institute for Supplementary Health Studies; IESS) monitors the functioning of supplementary health within a production chain (IESS, 2016). The process starts in the consumer industry and progresses through distributors, health care providers, and, finally, health insurance beneficiaries, who pay for their services through monthly fees. Three agencies regulate the supplementary health system in Brazil: the Agência Nacional de Vigilância Sanitária (National Agency of Sanitary Control; ANVISA), which is responsible for the sanitary and economic regulation of the hospital supplies market; the ANS, which regulates the financial and service dynamics among health insurance companies, beneficiaries, and service providers; and the Sistema Brasileiro de Defesa da Concorrência (Brazilian System for Competition Defense; SBDC), which aims to ensure competitiveness in the sector.

The ANS is a regulatory agency linked to the Ministry of Health. It has the authority to issue norms and is independent in its decision-making, administrative and financial processes. The ANS is responsible for regulating HICs (Cardoso, 2005). According to the IESS (2016), HICs are legal entities registered with the ANS that operate and commercialize private health care plans. They are classified into the medical/hospital and dental segments. Cardoso (2005) points out that some HICs may be subject to more than one regulatory body and scheme. Closed complementary pension entities, for example, have their main activity regulated by the national superintendence of complementary pensions. These entities have to meet the accounting standards established by the superintendence, along with those of the ANS.

As Salvatori and Ventura (2012) make clear, regulatory agencies perform executive, legislative and judiciary roles, since they oversee economic activities and rights, publish legal regulations (such as sectorial norms) and procedures, and impose sanctions on the players under their control. Among the legal powers granted to ANS in Law 9961/2000 are the following: proposing general policies and guidelines for regulating the sector; establishing standards, routines and procedures for recording, authorizing, maintaining and canceling the registration of the plans commercialized by HICs; issuing norms and standards for the presentation of the HICs' economic and financial information; and establishing parameters and indicators of quality for the health care coverage provided by the services rendered directly by HICs as well as services provided by third parties based on the commercial plans of HICs (ANS, 2017c).

Cardoso (2005) points out that the standardization of accounting practices allows comparability across HICs and highlights their economic and financial situations.

Accounting and financial information are necessary in order to form an understanding of a firm's economic and financial position, development, and trends (Assaf, 2010, p. 35), and other types of regulatory standardization helps consumers and other entities choose between HICs.

Brazil's qualification program for service providers began in 2004 and was redesigned in 2015 to improve services and bring them in line with the new rules and practices in the sector (ANS, 2017a). The evaluation carried out in the program is based on the IDSS, calculated using aggregated indicators in four dimensions: quality in health care, guarantee of access, sustainability in the market, and process and regulatory management. The IDSS bands range from 0 to 1, as shown in Figure 1.

The ANS claims that the qualification program evaluates improvements in HICs, stimulates competition and benefits the consumer. The ANS seeks to ensure that its dimension analysis is as close to the real-world situation as possible in order to improve the qualification program. The methodology used to evaluate the IDSS criteria thus changes as necessary. The dimension used to evaluate HICs' economic and financial stability and their capacity to fulfill their obligations has evolved, as shown in Box 1.

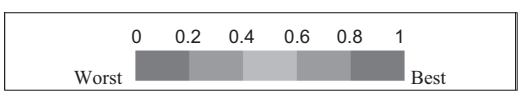
One issue regarding the sustainability indicator is that HICs may make discretionary accounting choices (about recognition and measurement), take operational decisions and/or select criteria for the presentation of financial statements (disclosure) within the limits of accounting standards designed to modify their reported earnings in order to influence the ANS' perceptions of the underlying economic facts.

Earnings management occurs when managers use discretionary criteria to manipulate financial statements, which can mislead users about the firm's economic performance (Cardoso, 2005). Martinez and Cardoso (2009) described earnings management as accounting practices and decision-making designed to prepare and disclose accounting numbers different from those that would be prepared and disclosed if such practices were not adopted. For Healy and Wahlen (1999) "earnings management occurs when managers use judgment in financial reporting and in structuring transactions to alter financial reports to either mislead some stakeholders about the underlying economic performance of the company or to influence contractual outcomes that depend on reported accounting numbers" (p. 368).

Dong (2016) collected financial data from all US hospitals that had requested reimbursement from the federal government for treating Medicare patients and regressed discretionary accruals on hospital size, profitability, asset liquidity, operating efficiency, labor cost and ownership. The findings provided direct evidence of the use of discretionary accruals to manage financial earnings among US hospitals in this special public (or quasi-public) service sector.

Research on earnings management in Brazil has used methods based on statistical models, including discretionary accruals detection models such as the Jones and Modified Jones model, which Dechow *et al.* (1995) argue explain variations in accruals most accurately. Brazilian research has also adopted management decision-making models for operational decisions, income distribution, specific accruals, income smoothing and accruals of abnormal working capital.

Although regulation is generally perceived as a mechanism that limits opportunistic behavior, it can have the opposite effect. Regulations generally aim at enhancing management incentives to improve performance, but such incentives may create pressure to manage earnings (El-Diri, 2018). Firms may manage earnings in different ways under the pressure of regulation. Regulatory investigations or new regulatory projects can drive firms



Source(s): Portal ANS

Figure 1.
Bands of evaluation grades

Box 1. Evolution of ANS measure of economic and financial dimensions of HICs

Year	Abbreviation	Indicators	Formulas
2012–2014	IDEF	NAI – Net asset indicator	NAI = (Adjusted net asset)/(Solvency margin)
		CLI – Current liquidity indicator	ILC = (Current asset)/(Current liability)
		IPEINR – Indicator of provision for events incurred but not reported	IPEINR = (0 if the accounting of PEINR is insufficient in the 4th quarter; 1 if PEINR is sufficient in the 4th quarter)
		ISG – Indicator of sufficient guarantee assets	ISG = (0 if there is no sufficient guarantee; 1 if there are guarantee assets)
2015–2019	IDSM	IOR – Indicator of own resources	IOR = (Adjusted net asset)/(Solvency margin)
		IFA – Indicator of financial availability	IFA = (Current assets)/(Current liability)
		IR – Inspection rate	$IR = (1.0 \times UDA^{*} + 0.5 \times UDN - A^{**} + 0.25 \times EVRA^{**} + 0.25 \times EVRN - A^{****})/(2 \times Average\_Beneficiary) \times 10{,}000$
		RR – Rate of resolution of preliminary intermediation notification	RR = (Total demand of preliminary intermediation notification (PIN), classified as: RVE, Inactive, Preliminary notification)/(Total of social classified PIN demands) × 100

Note(s): *Total of the HIC's unresolved demands of preliminary intermediation notification (PIN) related to services in the period; **Total of the HIC's unresolved demands of PIN non-related to services in the period; ***Total of the HIC's demands of PIN related to services classified as Effective Voluntary Reparation (EVR); ****Total of the HIC's demands of PIN non-related to services classified as EVR
Source(s): ANS website

to manage discretionary accruals downwards in order to demotivate regulators from issuing strict norms.

Therefore, the managers of HICs may have an incentive to avoid presenting indications of abnormality to avoid monitoring by the ANS. As it is the qualification program that evaluates the overall performance of HICs, users can refer to it when buying or changing plans; firms thus seek a high IDSS ranking. Accordingly, this study proposes the following:

Hypothesis 1. The managers of HICs use earnings management to avoid reporting a low sustainability performance indicator.

3. Methodology

This study performed hypothetical-deductive and quantitative analyses using secondary and longitudinal data. The main method used was an empirical and descriptive analysis of a sample composed of all HICs actively enrolled in the ANS. A probabilistic sample was selected covering 2012 to 2018.

The study examined HICs that, according to ANS data, conducted financial transactions totaling approximately 179 billion reals and served about 24% of the Brazilian population via private health care and dental (exclusive) plans in 2017. Since HICs send accounting and financial information to the ANS quarterly, the database was constructed using information from the fourth quarter of each year.

The study used several measures to detect earnings management: the Jones (1991) and Modified Jones model (Dechow *et al.*, 1995) was used to estimate discretionary accruals, and the model described by Roychowdhury (2006) was used to detect abnormal behavior in operational decisions. According to Dechow *et al.* (1995), standard errors tend to be lower for the Jones and Modified Jones models, in which they are more efficient in the time series. According to Magro *et al.* (2019), the Modified Jones Model has been the most widely used in both the international and national literature, though they recognized that other, more recent models may offer different perspectives.

The control variables were calculated and the performance indicators, IDSM (2015–2018) and IDEF (2012–2014), were compiled from all HICs with valid ANS registration. IDSM data for 2019 were not used because the ANS had not made them available at the time of the study. We excluded HICs that sent no lagged accounting information ($t-1$) to the ANS and those that presented negative net assets (NA). The full set of data adjustments are shown in Table 1.

Data on 1,362 health insurance companies were analyzed covering 2012 to 2018, for a total of 7,549 observations and an average of 5.54 observations per company, as seen in Panel A, Table 2. The distribution of observations per year was relatively homogeneous. Therefore, the inhomogeneous sample bias was controlled for (Ferreira *et al.*, 2012), as shown in Panel B, Table 2.

		Exclusions		Adjusted	Exclusions	Adjusted
Year	Observations	Adjustment ($t-1$)	NA < 0	Observations for earning management	Without IDSM/IDEF	Final sample for IDSM/IDEF analysis
2012	1,283	31	113	1,139	162	977
2013	1,263	41	111	1,111	158	953
2014	1,240	42	96	1,102	177	925
2015	1,203	31	83	1,089	209	880
2016	1,173	32	90	1,051	194	857
2017	1,129	30	64	1,035	201	834
2018	1,112	44	46	1,022	215	807
Total	*8,403*	*251*	*603*	*7,549*	*1,316*	*6,233*

Table 1.
Data adjustments

Panel A: Sample	
Number of HPCs studied	1,362
Total number of observations	7,549
Number of years studied	6
Average of observations per HPCs	5.54

Panel B: Sample per year		
Year	Observations	%
2012	1,139	15
2013	1,111	15
2014	1,102	15
2015	1,089	14
2016	1,051	14
2017	1,035	14
2018	1,022	14
Total	*7,549*	*100*

Table 2.
Descriptive statistics of sample for earning management

3.1 Model for detecting earnings management

According to Martinez (2013), most Brazilian empirical studies use accrual-based detection models. As noted above, the study used the Jones and Modified Jones models to detect earnings management through discretionary accruals (DA), and the model described by Roychowdhury was used to detect abnormal behaviors in operational decisions due to its popularity and wide use in academic research (Almeida, 2006; Martinez, 2013; El-Diri, 2018). The Fama and MacBeth (1973) method was used in the regressions of the models to detect earnings management.

The ANS does not make HIC cash flow statements (CFSs) available, so total accruals (TA_{it}) were estimated based on their balance sheets (Dechow *et al.*, 1995; Martinez, 2013; Heese, 2018) using Equation (1):

$$TA_{it} = [(\Delta CA_{it} - \Delta Cash_{it}) - (\Delta CL_{it} - \Delta STD_{it}) - Dep_{it}]/A_{it-1} \quad (1)$$

where ΔCA_{it} is the change in the current assets of firm I at the end of period $t-1$ to the end of period t; $\Delta cash_{it}$ is the change in the cash availability of firm I at the end of period $t-1$ to the end of period t; ΔCL_{it} is the change in the current liabilities of firm I at the end of period $t-1$ to the end of period t; ΔSTD_{it} is the change in short-term debt of firm I at the end of period $t-1$ to the end of period t; Depit is the depreciation and amortization expense of firm I during period t; and A_{it-1} are the total assets of firm I in year $t-1$.

The coefficients α_i, β_{1i}, and β_{2i}, of Equation (3) are estimated via the regression of Equation (2), and the discretionary accruals of the Jones model are predicted by ε_{it}:

$$TA_{it}/A_{it-1} = \alpha_i[1/A_{it-1}] + \beta_{1i}[\Delta REV_{it}] + \beta_{2i}[PPE_{it}] + \varepsilon_{it} \quad (2)$$

To calculate non-discretionary accruals using the Modified Jones model, we use the coefficients and the variables of Equation (3):

$$NDA_{it} = \alpha_i[1/A_{it-1}] + \beta_{1i}[\Delta REV_{it} - \Delta REC_{it}] + \beta_{2i}[PPE_{it}] \quad (3)$$

where NDA_{it} are the non-discretionary accruals of firm I in year t; A_{it-1} are the total assets of firm I in year $t-1$; ΔREV_{it} is the change in gross revenue of firm I between years t and $t-1$, weighted by the total assets at the end of period $t-1$; ΔREC_{it} is the change in accounts receivable for firm I between years t and $t-1$, weighted by total assets at the end of period $t-1$; and PPE_{it} are the property, plant, and equipment of firm I in year $t-1$, weighted by total assets at the end of period $t-1$.

As Dechow *et al.* (1995) point out, discretionary accruals (DA) are estimated by subtracting nondiscretionary accruals (NDA) from total accruals (TA), as in Equation (4). Paulo (2007) points out that, with the inclusion of the variable ΔREC_{it} in the Modified Jones model, discretionary accruals are no longer found by the residuals of Equation (2):

$$DA = TA - NDA \quad (4)$$

Real earnings management (REM) was calculated using the model proposed by Roychowdhury (2006), as shown in Equations (5) and (6). According to Paulo and Mota (2019), this model measures the normal activity levels of a company in order to predict abnormal behaviors via the residue; the result is obtained by summing the behaviors, as in Equation (7). No estimation of FCS behavior was attempted because the net effect is ambiguous, as it is affected in different directions (Zang, 2012; Paulo and Mota, 2019):

$$Prod_t/A_{t-1} = \alpha_0 + \alpha_1[1/A_{t-1}] + \beta_1[REV_t/A_{t-1}] + \beta_2[\Delta REV_t/A_{t-1}] + \beta_3[\Delta REV_{t-1}/A_{t-1}] + \varepsilon_{it} \quad (5)$$

$$Desp_t/A_{t-1} = \alpha_0 + \alpha_1[1/A_{t-1}] + \beta_1[REV/A_{t-1}] + \varepsilon_{it} \quad (6)$$

$$\mathrm{REM}_{it} = \mathrm{Ab\_Prod}_{it} + (-1 * \mathrm{Ab\_Desp}_{it}) \quad (7)$$

where Prod_t is the production costs of firm I in year t, weighted by the total assets at the end of period $t-1$; Desp_t is the operating expenses of firm I in year t, weighted by the total assets at the end of period $t-1$; REV_t is the net revenues of firm I in year t, weighted by the total assets at the end of period $t-1$; $\Delta\mathrm{REV}_t$ is the change in net revenues of firm I in year t for period $t-1$, weighted by the total assets at the end of period $t-1$; $\Delta\mathrm{REV}_{t-1}$ is the change in net revenues of firm I in year $t-1$ for period $t-2$, weighted by the total assets at the end of period $t-1$; $\mathrm{Ab\_Prod}_{it}$ is the abnormal behavior for production costs of firm I in year t; and $\mathrm{Ab\_Desp}_{it}$ is the abnormal behavior for operating expenses of firm I in year t;

3.2 Proposed model

The measurements expressed in Equations (8–9) verify whether the performance (IDSM and IDEF) of HICs is related to the DA:

$$\text{HIC performance}_{it} = \alpha + \beta_1 \mathrm{DA}_{it} + \beta_2 d\_\mathrm{IDSM}_{it} + \text{Controls}\Gamma_{it} + \varepsilon_{it} \quad (8)$$

$$\text{HIC performance}_{it} = \alpha + \beta_1 \mathrm{DACC}_{it} + \beta_2 d\_\mathrm{IDSM}_{it} + \text{Controls}\Gamma_{it} + \varepsilon_{it} \quad (9)$$

$$\text{HIC performance}_{it} = \alpha + \beta_1 \mathrm{REM}_{it} + \beta_2 d\_\mathrm{IDSM}_{it} + \text{Controls}\Gamma_{it} + \varepsilon_{it} \quad (10)$$

where HIC $\mathrm{performance}_{it}$ represents IDSM and IDEF); DA_{it} denotes discretionary accruals in the Jones model for firm I in year t; DACC_{it} denotes discretionary accruals in the Modified Jones model for firm I in year t; and REM_{it} is the abnormal behaviors of operational decisions of firm I in year t. The control variables are as follows: SIZE_{it} is the natural logarithm of Total Asset of firm I in year t; LEV_{it} is the degree of financial leverage of firm I in year t; ROA_{it} is the return on assets of firm I in year t; INDEBT_{it} is the Indebtedness of firm I in year t; and ε_i is the regression residue for firm I in year t.

The control variables are firm size, degree of total leverage, asset return and indebtedness calculated as shown in Box 2.

The study used firm size (SIZE), expressed as the natural log of total assets, because HIC performance may be partly explained by its size. Dechow and Dichev (2002) also used the logarithm of total assets as a measure of firm size. Barnett and Salomon (2012) used financial leverage (LEV) as a control proxy in their performance analysis, as debt increases the volatility of future earnings. Return on assets (ROA) was used as a measure of performance because they represent future economic benefits (Joia and Nakao, 2014). Kothari *et al.* (2005) found that tests that used return on assets as a measure of performance were well-specified and had substantial power. Indebtedness (INDEBT) was adopted as a variable following

Box 2. Control variables

Variable	Abbreviation	Formulas	References
Firm size	SIZE	Natural log of total assets	Dechow and Dichev (2002)
Financial leverage	LEV	Total liabilities/Total assets	Barnett and Salomon (2012)
Return on assets	ROA	Edit/Total assets	Kothari *et al.* (2005), Joia and Nakao (2014)
Indebtedness	INDEBT	Onerous liability/Total assets	Watts and Zimmerman (1990) Joia and Nakao (2014)

Watts and Zimmerman's (1990) finding that managers of companies with higher indebtedness tended to use methods that allowed them to show increasing results and Barnett and Salomon's (2012) finding that debt affected the behavior of managers.

4. Analysis of results

This section presents a data description and analysis of the Jones and Modified Jones models, the model described by Roychowdhury, and the proposed regression model.

4.1 Jones, Modified Jones and Roychowdhury models

Table 3 presents the descriptive statistics of the variables used in our Jones, Modified Jones and Roychowdhury models. Panel A describes the variables used for the accruals earnings management calculation, and Panel B describes the variables used for the real earnings management calculation. Total accruals (TA_{it}) had an average of −0.0291, with a SD of −0.0276. $Prod_{it}$ and $Desp_{it}$ had averages of 1.4796 and 1.1255, respectively, indicating that, on average, both act in favor of a positive REM signal (Paulo and Mota, 2019).

The variables shown in Table 3 did not follow a normal distribution, at a significance level of 0.01, in Jarque–Bera and Kolmogorov–Smirnov tests. Hoffmann (2016, p. 47) states that, based on the central limit theorem, a large number of independent random variables have approximately normal distributions when none of them is dominant; thus, the estimates of the ordinary least squares (OLS) method satisfy the asymptotic normality.

Paulo (2007) states that estimates of the coefficients used to calculate discretionary accruals through time series require an expanded data-gathering period. Therefore, the regression performed to estimate the coefficients of the Modified Jones model used the cross-sectional approach via the Fama and MacBeth (1973) method.

4.2 Results of proposed model in terms of performance

Table 4 presents the descriptive statistics of the variables in the regression model used to capture the effect of earnings management in HIC performance. The variables did not follow a normal distribution at the 0.01 significance level in Jarque–Bera and Kolmogorov–Smirnov tests.

Variables	Mean	Median	SD	Minimum	Maximum
Panel A: Variables for accruals earnings management calculation					
TA_{it}	−0.0291	−0.0276	1.3473	−26.8898	97.6802
$1/A_{it-1}$	2.32E-06	1.19E-07	7.00E-06	9.39E-10	5.13E-05
ΔREV_{it}	0.6785	0.1839	6.9852	−9.1695	408.2076
ΔREC_{it}	0.0590	0.0006	1.3224	−0.9531	98.4902
PPE_{it}	0.1928	0.1148	0.2068	0.0000	0.9998
Panel B: Variables for real earnings management calculation					
Ab_Prod_{it}	1.4796	1.1817	5.3153	0.0000	352.1589
Ab_Desp_{it}	1.1255	0.7083	2.0622	−0.0016	62.4721
$1/A_{it-1}$	2.32E-06	1.19E-07	7.00E-06	9.39E-10	5.13E-05
REV_{it}/A_{it-1}	2.7188	2.1323	7.0366	−0.0060	408.2076
REV_{it-1}/A_{it-2}	2.0403	1.8888	1.3737	−0.0027	20.5024
$\Delta REV_{it}/A_{it-1}$	0.6785	0.1839	6.9852	−9.1695	408.2076
$\Delta REV_{it-1}/A_{it-1}$	0.2293	0.1822	0.9121	−20.3082	13.7827

Note(s): The variables do not follow the normal distribution in the Jarque-Bera and Kolmogorov–Smirnov tests

Table 3.
Descriptive statistics

Variables	Mean	Median	SD	Minimum	Maximum
$IDSM_{it}$	0.8323	0.8907	0.1887	0.0000	1.0000
$IDEF_{it}$	0.7172	0.8296	0.2895	0.0000	1.0000
DA_{it}	−0.0291	−0.0574	0.2572	−0.3399	14.6767
$DACC_{it}$	−0.0587	−0.0348	1.3570	−27.0438	95.2814
REM_{it}	0.3412	0.3079	4.6350	−8.5985	295.4753
LEV_{it}	0.5244	0.5671	0.2971	−5.1109	0.9995
ROA_{it}	0.0273	0.0193	0.4760	−10.8802	10.0939
$SIZE_{it}$	15.7553	16.1261	2.3881	9.8784	20.7863
$INDEB_{it}$	0.0453	0.0000	0.0998	0.0000	1.3226

Note(s): [1]The variables do not follow the normal distribution in the Jarque-Bera and Kolmogorov–Smirnov tests. [2]HIC performance is presented via IDSM (2015–2018) and IDEF (2012–2014) indices. [3]IDSM data for the 2019 base year were not included because the ANS did not make them available during the study period

Table 4.
Descriptive statistics – Proposed regression model

The graphical representation in Figure 2 shows that, on average, the smaller the band of the HIC performance (i.e. the worse the indicator), the greater the discretionary accruals (DA), indicating that discretionary accruals are managed to avoid reporting poor indicators (Greenwood *et al.*, 2017). The data used to calculate the mean of the DA values were in module form.

We conducted Student's *t*-test, a parametric test, and a non-parametric Kruskal–Wallis test to verify if the means of the discretionary accruals by band were significantly different. The parametric test was performed with the 1st and 5th bands, and the non-parametric test was performed with all the ranges. Both tests showed evidence of significant mean differences in the discretionary accruals.

The greatest level of earnings management appeared in the 1st band (worst indicator); the level reduced gradually in the 2nd, 3rd, 4th and 5th bands (with the least earnings management seen in the 5th, the best indicator). These results are consistent with the hypothesis that HICs with the worst performance indicators tend to use earnings management more aggressively and frequently.

Table 5 presents the results of the proposed regression model used to capture the effect of earnings management in HIC performance.

The parameters generated by the regression of Equations (8–9) are shown in Table 5. In both models, statistical significance at the 0.01 level was found in DA_{it}, REM_{it}, $IDSM_{it}$, LEV_{it},

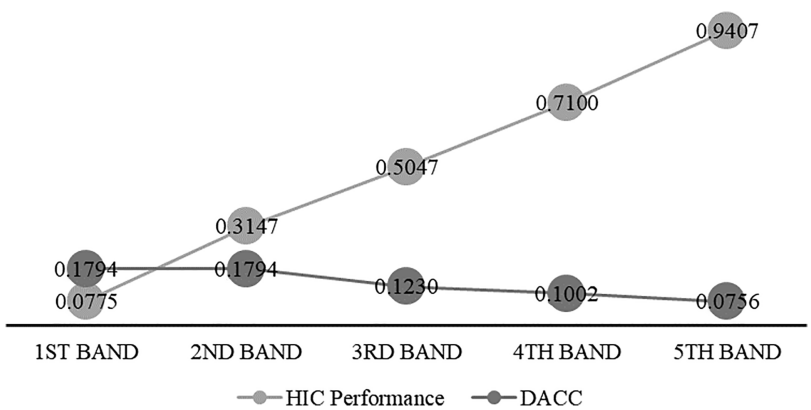


Figure 2.
Comparison of HIC performance and DACC per qualification band

Variables	Jones model	Modified Jones model	Roychowdhury model[2]
DA_{it}	−0.0615*** (0.0203)		
$DACC_{it}$		0.0126* (0.0072)	
REM_{it}			−0.0037*** (0.0008)
d_IDSM_{it}	0.0447*** (0.0085)	0.0452*** (0.0085)	0.0425*** (0.0086)
LEV_{it}	−0.2283*** (0.0340)	−0.2266*** (0.0344)	−0.2308*** (0.0350)
ROA_{it}	0.0570** (0.0224)	0.0552** (0.0223)	0.0545** (0.0226)
$SIZE_{it}$	0.0877*** (0.0140)	0.0873*** (0.0140)	0.0925*** (0.0142)
$INDEBT_{it}$	−0.3188*** (0.0667)	−0.3200*** (0.0669)	−0.3212*** (0.0677)
Constant	−0.5220** (0.2249)	−0.5136** (0.2244)	−0.5933*** (0.2292)
Observations	6,233	6,233	6,170
R^2	0.123	0.122	0.124
AIC	−4987.7003	−4977.0206	−4969.7878

Note(s): [1]*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. [2]Proposed by Paulo and Mota (2019)

Table 5.
Coefficients – Proposed regression model for HIC performance

$SIZE_{it}$ and $INDEBT_{it}$; statistical significance at the 0.05 level was found in ROA_{it}; and statistical significance at the 0.10 level was found in $DACC_{it}$.

As the Chow, Breusch–Pagan and Hausman tests were used to define the model, the fixed effects for the regression model of Equations (8–9) were thus most appropriate. The Wooldridge test detected the existence of serial autocorrelation, and the Wald test detected the existence of heteroscedasticity. The variables of the proposed regression model did not follow a normal distribution, at a significance level of 0.01, in the Jarque–Bera and Kolmogorov–Smirnov tests.

The study corrected for serial autocorrelation and heteroscedasticity using the robust estimation method in the adjusted fixed effects model, as shown in Table 6. Normality assumptions were relaxed in the inferences of the model parameters, since the coefficients were asymptotically consistent and not biased, even in the presence of serial autocorrelation and heteroscedasticity (Formigoni *et al.*, 2009; Ferreira *et al.*, 2012).

The results indicate, with strong statistical support, that an increase in discretionary accruals leads to an increase in HIC performance. These findings corroborate the hypothesis that earnings management is used to increase these indicators and thus improve perceptions of the economic and financial vitality of HICs among regulators and users. The positive and significant coefficient provides evidence that increased earnings management leads to increased HIC performance. Thus, earnings management is used to increase the key indicators, reducing the possibility of more rigorous ANS supervision.

Variables	Jones model	Modified Jones model	Roychowdhury model[2]
DA_{it}	−0.0599*** (0.0211)		
$DACC_{it}$		−0.0156** (0.0077)	
REM_{it}			−0.0035*** (0.0007)
d_IDSM_{it}	0.0448*** (0.0085)	0.0447*** (0.0086)	0.0429*** (0.0086)
LEV_{it}	−0.2291*** (0.0341)	−0.2277*** (0.0342)	−0.2301*** (0.0352)
ROA_{it}	0.0560** (0.0223)	0.0552** (0.0223)	0.0532** (0.0224)
$SIZE_{it}$	0.0880*** (0.0140)	0.0881*** (0.0140)	0.0915*** (0.0142)
$INDEBT_{it}$	−0.3191*** (0.0667)	−0.3173*** (0.0667)	−0.3209*** (0.0679)
Constant	−0.5201** (0.2248)	−0.5246** (0.2249)	−0.5768** (0.2286)
Observations	6,233	6,233	6,170
R^2	0.123	0.122	0.124
AIC	−4985.8862	−4979.5060	−4968.2537

Note(s): [1]*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. [2]Proposed by Paulo and Mota (2019)

Table 6.
Proposed coefficients regression model for HIC performance – adjusted fixed effects per DA module

We verified the robustness of our conclusions using the proposed regression model, which included DA_{it} in the module (see Table 6). This test examined two earnings management scenarios: income-increasing and income-decreasing. A higher DA_{it} in the module represents more intense earnings management, while a lower (i.e. near zero) DA_{it} reflects less intense earnings management.

The coefficients of DA_{it}, $DACC_{it}$ and REM_{it} estimated in the regression were negative and significant. This result corroborates the finding that more intense earning management is associated with lower HIC performance. Thus, earnings management is more pronounced in HICs with lower HIC performance scores. These statistical findings offer sufficient evidence that HIC managers engage in earnings management through discretionary accruals and operational decisions to avoid reporting low sustainability indicators, with the practice more pronounced in companies showing lower HIC performance.

Table 7 presents the results for the performance indicators in the IDEF (2012–2014) and IDSM (2015–2018) periods. Evidence of earnings management is seen in both periods, via both accruals and operational decisions in order to improve HICs' scores.

5. Final considerations

This study aimed to empirically determine whether there is statistical evidence that HICs use earnings management to avoid reporting a low IDSM. The proposed regression model sought to capture whether HIC performance was significantly impacted by the use of earnings management through discretionary accruals and operational decisions. To ensure robustness, we used control variables employed in previous studies and static models.

Earnings management has negative consequences for financial reporting because it masks the consequences of management decisions. Earnings management manipulates accounting to meet a certain target. This may be motivated by a need to maintain certain economic and financial indicator levels due to the pressure to show an increasing trend or financial vitality, or to achieve goals set by regulators.

This study's data suggest that Brazilian HICs use earnings management through discretionary accruals and operational decisions to avoid reporting a low performance. The performance measured by IDSM is part of the calculation of the IDSS, an evaluation method adopted in the HIC qualification program of the ANS.

The ANS has established a recovery plan for HICs with very low IDSM and IDEF values. Such values may create serious administrative abnormalities, such as practices that lead to service denial or interruption on collective, recurrent and non–point-in-time levels, thus causing serious assistive, actuarial, structural or operational failures that carry a risk to the quality and continuity of health care, as pointed out by RN 256/2011 of the ANS (ANS, 2017d). According to the ANS, the *risco assistencial* (service risk) consists of administrative and service abnormalities (ANS, 2017b).

The ANS performance indicators (IDEF and IDSM) are not effective at limiting opportunistic behavior. To the contrary, HICs with low indicators have an incentive to manipulate earnings. Regulations, in their quest to monitor performance, create management incentives to manage earnings (El-Diri, 2018). Firms may manage earnings in different ways under the pressure of regulation, such as by misrepresenting income increases or decreases.

The effective monitoring of the economic and financial dimensions of HICs is crucial for the maintenance of contracts signed in accordance with legislation. The fact that HICs may use earnings management introduces additional risk to the system, which must be diagnosed and treated to avoid negative repercussions for users.

As Macadar *et al.* (2015) point out, Brazil, as an evolving democracy, has followed global trends and allowed the expansion of mechanisms of social control and the exercise of citizenship through transparency. Platt *et al.* (2007) argue that three elements are

Table 7. Coefficients – proposed regression model for HIC performance – adjusted fixed effects per DA module by period

Variables	IDEF (2012–2014) Jones model	Modified Jones model	Roychowdhury model[2]	IDSM (2015–2018) Jones model	Modified Jones model	Roychowdhury model[2]
DA_{it}	−0.0886*** (0.0237)			−0.0718** (0.0330)		
$DACC_{it}$		−0.0483*** (0.0090)			−0.0418*** (0.0081)	
REM_{it}			−0.0066*** (0.0014)			−0.0269*** (0.0025)
LEV_{it}	−0.2755*** (0.0203)	−0.2737*** (0.0202)	−0.2848*** (0.0205)	−0.2693*** (0.0149)	−0.2630*** (0.0149)	−0.2603*** (0.0148)
ROA_{it}	0.1459*** (0.0144)	0.1447*** (0.0143)	0.1461*** (0.0149)	0.0385*** (0.0081)	0.0377*** (0.0081)	0.0358*** (0.0081)
$SIZE_{it}$	0.0203*** (0.0024)	0.0194*** (0.0024)	0.0198*** (0.0024)	0.0124*** (0.0014)	0.0115*** (0.0014)	0.0094*** (0.0014)
$INDEBT_{it}$	−0.3967*** (0.0491)	−0.3926*** (0.0490)	−0.3910*** (0.0492)	−0.0799** (0.0388)	−0.0822** (0.0386)	−0.0904** (0.0384)
Constant	0.5722*** (0.0361)	0.5855*** (0.0362)	0.5845*** (0.0363)	0.7762*** (0.0227)	0.7883*** (0.0226)	0.8322*** (0.0229)
Observations	2,855	2,855	2,821	3,378	3,378	3,349
R^2	0.135	0.140	0.140	0.114	0.120	0.143
AIC	614.5280	599.6681	579.0325	−2081.1838	−2103.2181	−2184.6460

Note(s): [1] *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$. [2] Proposed by Paulo and Mota (2019)

required to ensure this transparency: (1) publicity and the wide public dissemination of information; (2) comprehensibility, via the visual presentation of information; and (3) usefulness for decision-making (i.e. relevance). Thus, transparent and reliable financial and economic information about HICs is crucial to ensure the efficient operation of the system.

Future research should conduct a more detailed analysis of the service risk faced by the ANS by investigating other evaluation dimensions of HICs and examining how these correlate to the companies' economic and financial characteristics. Such studies should determine whether HICs are using earnings management to avoid the revelation of serious administrative abnormalities and mask serious problems with the operation and sustainability of the plans they are offering.

This study may be limited due to its use of the Modified Jones Model. Though it is very common in the literature, it can create serious measurement errors in the computation of discretionary accruals, and it is not ideal for companies with profiles similar to those of HICs.

Healthcare is a serious issue, and it has no room for pretenses, falsehoods, or commercial interests. It is thus crucial that regulators improve the mechanisms that monitor the financial health of HICs in order to combat the use of earnings management to artificially increase indicators and hide risks from regulators and users. Proactive regulatory and monitoring instruments are required to preserve the interests of the millions of people who depend on the support of HIC plans when they are at their most vulnerable.

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Human resource development and turnover intention: organizational commitment's role as a mediating variable

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Abstract

Purpose – The purpose of this paper is to examine the effect of human resource development on turnover intention through the mediating role of organizational commitment.

Design/methodology/approach – This paper used a quantitative research design. Data were collected from 204 flight attendants employees working at Royal Jordanian Airlines Company using an email survey questionnaire. Structural equation modeling (SEM) was adopted to test the hypothesized model.

Findings – The results assure positive effect of human resource development (HRD) on organizational commitment. Negative effect of both HRD and organizational commitment to turnover intention is observed. The results also confirm that the effect of HRD on turnover intention is negatively mediated by organizational commitment.

Originality/value – This research paper extends the literature by empirically adducing evidence that organizational commitment negatively mediated the effect of human resource development on turnover intention of the airlines in Jordan.

Keywords Human resource development, Organizational commitment, Turnover intention, Aviation industry, Jordan

Paper type Research paper

1. Introduction

Today, a shortage of talented flight attendants, low retention rates and high turnover rates persistently challenge aviation organizations worldwide. In Jordan, the retention of qualified flight attendants has become one of the main challenges for aviation organizations. Failing to retain talented flight attendants has caused increased turnover rates in aviation organizations. The literature evidence suggests that turnover rate increases can increase organizational costs (Bhatti *et al.*, 2016; Rawashdeh and Tamimi, 2019) monetary and nonmonetary. On the one hand, recruiting and hiring the best new applicants incurs monetary costs (Haider *et al.*, 2015).

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On the other hand, nonmonetary costs include losing skilled, knowledgeable employees to other organizations (Nasurdin *et al.*, 2018). Turnover rate increases have led aviation organizations to bear additional charges because of the continuous hiring of new flight attendants. So, aviation organizations must seek ways to reduce turnover intentions (TOI) among their workers and increase their retention rates for highly skilled and well-trained flight attendants. Organizational commitment (ORC) has been a popular and well-documented predictor of turnover among employees (Kadiresan *et al.*, 2015; Bhatti *et al.*, 2016). But recently, scholars echoed the possible implications of human resource development (HRD) for ORC, turnover and related work outcomes (Kareem and Hussein, 2019; Nawaz and Pangil, 2016). HRD is a framework designed to help employees develop and gain new skills, knowledge and competencies that subsequently contribute to organizational effectiveness. Specifically, HRD bundles activities such as training development, compensation, career enhancement, performance evaluations and firm development together to enhance organizational effectiveness both at the individual and organizational levels (McLagan, 1989). So, HRD and ORC should be a part of the model to predict TOI.

HRD has significantly influenced TOI (directly or indirectly) through ORC (Nawaz and Pangil, 2016). Kadiresan *et al.* (2015) used a sample from the manufacturing industry, and Juhdi *et al.* (2013) used employees working in the insurance and finance industries, banks and higher educational institutions. But little research has been conducted, and its geographical scope remains limited. It requires supplementation with additional analysis in other regions, industries (i.e. aviation) and contexts (i.e. developing countries), as the results would provide valuable guidance for managerial practices. Social exchange theory (SET) supports the intervening role of ORC on the causal link between HRD and TOI, as noted by Blau (1964), who postulated that individuals enter a relationship with a firm in exchange for benefits (Jawaad *et al.*, 2019; De Juana-Espinosa and Rakowska, 2018). According to this theory, when employees perceive their relationship or bond with their hiring organization as positive, they increase in commitment to the firm, becoming less inclined to leave the organization (Cherif, 2020). Shehawy *et al.* (2018) examined the determinants of airline workers' job embeddedness in Egypt. Choi and Jang (2018) conducted a study on the job anxiety, TOI and job satisfaction of aviation security employees. Satardien *et al.* (2019) scrutinized the nexus between perceived organizational support, ORC and TOI among South African aviation industry employees. Building on SET, Chung and Jeon (2020) examined the nexus between job satisfaction and TOI in the airline industry. Alola and Alafeshat (2021) researched human resource practices' impact on employee engagement in the Jordanian airline industry.

Interestingly, the extant literature also denotes that past research has focused on investigating various aviation careers, such as load control agents and support staff (Satardien *et al.*, 2019), aviation security search employees (Choi and Jang, 2018) and cabin attendants (Cho and Ko, 2010). But the current paper focuses on Royal Jordanian Airlines' flight attendants to gauge for variations. The extant literature suggests a lack of research on the roles of HRD and ORC in predicting TOI in a developing country's aviation industry. This paper's objective is threefold. It first aims to investigate HRD's impact on ORC and TOI. Second, it examines the ORC's influence on TOI. Third, it predicts HRD's impact on TOI through the mediating role of ORC. The study's findings will help airline managers and policymakers develop appropriate strategies to enhance HRD, stimulating flight attendants' ORC and minimizing their intentions to resign.

This study consists of five sections. The current section provides a brief overview and the motivations and objectives of the study. Section 2 provides the study model and proposed hypotheses. Section 3 describes the sampling, data collection tools and research instruments. Section 4 presents the research findings. The final section offers the key results and implications for aviation companies, followed by the limitations and future research prescriptions.

2. Literature and hypotheses development

2.1 Human resource development

HRD is a collection of interrelated internal activities designed to stimulate individuals' skills, knowledge and competencies (Nawaz and Pangil, 2016; Rawashdeh and Karim, 2012). Organizational survival and effectiveness rely substantially on the efficiency of its human capital and activities (Simões *et al.*, 2018; Uma *et al.*, 2017), especially employees' skills and competencies (Ong *et al.*, 2019), which are essential for firms to meet their predetermined goals and objectives (Ana *et al.*, 2019). Possessing qualified, skilled human resources is the most significant capital for firms because human capital impacts and constitutes firms' various resources while being influenced by them (Koç *et al.*, 2014). HRD is concerned with promoting employees' knowledge and capabilities through a series of organized human resource (HR) practices (Kareem and Hussein, 2019). HR practices that work with the organizational strategy focus on creating positive outcomes within a reasonable time (Rafik *et al.*, 2019). Investment in HR practices is a critical source of positive organizational performance, as it enhances employees' motivation, skills, knowledge and ORC, reducing TOI (Kareem and Hussein, 2019). HRD (in this study) comprises three practices, namely, training and development, compensation and performance appraisals, based on Nawaz and Pangil's (2016) study. The most significant HR functions connected with employee TOI are fair compensation criteria, good performance appraisal criteria and training and development. They have been described as the main drivers of employees' intentions to commit to or leave their organizations (Aburumman *et al.*, 2020; Juhdi *et al.*, 2013; Kadiresan *et al.*, 2015).

2.2 Human resource development and organizational commitment

ORC is categorized mainly into three forms. *Affective commitment* reflects an individual's personal connection to and discernment with the hiring organization and their ultimate participation in organizational affairs. *Continuance commitment* reflects an individual's cost-benefit analysis of continuing or terminating employment with the hiring organization. Lastly, *normative commitment* reflects an individual's sense of obligation to remain with the employer (Norm *et al.*, 2017; Rawashdeh and Tamimi, 2019). HRD should establish a positive work environment to motivate employees to become more committed and productive (Rafik *et al.*, 2019). Effectively implemented HR practices can also stimulate individuals' commitment and performance (Cai *et al.*, 2019). HR practices are considered one of the best predictors used widely to examine employee's ORC (Cherif, 2020). Several studies have been conducted in various countries and contexts. All documented a significant correlation between different HR practices and ORC. For example, Koç *et al.* (2014) conducted research in Turkish private organizations on HR practices, job satisfaction and ORC and discovered a positive association between the studied variables. In Jordan, Suifan (2015) studied some public and private organizations. His findings indicated a positive, significant relationship between HR practices ("training, person-organization fit, and rewards") and ORC. In their study, Fihla and Chinyamurindi (2018) reported the significant influence of HR practices (hiring and retaining policies, training and development, rewards and performance management) on ORC among South African workers, supporting the conclusions reached by Cherif (2020) and Abdirahman (2015). Accordingly, we propose the following hypothesis:

H1. HRD has a positive influence on employees' organizational commitment.

2.3 Organizational commitment and turnover intention

ORC is a psychological condition connecting individuals to an organization (Alamri and AL-Duhaim, 2017). ORC is individuals' emotional attachment to their hiring organization that supports their loyalty and reduces their intention to quit (Nawaz and Pangil, 2016). ORC is

denoted as a determinant for higher levels of TOI (Wong and Wong, 2017) because individuals with high levels of ORC are less likely to leave their hiring organizations (Bonds, 2017). So, individuals' TOI relies mainly on their ORC (Labrague *et al.*, 2018). Most previous studies found ORC significantly negatively affected TOI. Ekhsan's (2019) Indonesian study found ORC negatively affected TOI. In their Taiwanese study, Hung *et al.* (2018) showed ORC's negative impact on TOI. Agarwal and Sajid (2017) also studied public and private Indian organizations and demonstrated a negative relationship between ORC and TOI. Similarly, Tarigan and Ariani (2015) found a negative, significant relationship between ORC and TOI. Their results were supported by Habib *et al.*'s (2014) and Rawashdeh and Tamimi's (2019) studies. Accordingly, we propose the following hypothesis:

H2. Organizational commitment has a negative influence on employees' turnover intention.

2.4 Human resource development and turnover intention

HRD is a set of various interrelated HR practices to develop and retain the best, most qualified employees (Rafik *et al.*, 2019). Firms can also direct HR practices toward reducing employee turnover (Nawaz and Pangil, 2016). Firms' effective implementation of HR practices enhances individuals' skills and capabilities and reduces TOI (Mira *et al.*, 2019). Generally, individuals are more likely to remain committed to a firm (rather than quit) when they accept and value HR initiatives such as training and development, compensation and performance assessments (Kadiresan *et al.*, 2015; Nasurdin *et al.*, 2018). Some previous studies have reported that HR practices can influence employee TOI. Ozolina-Ozola (2014) conducted a Latvian study. It demonstrated the significant effect of HR practices ("training, rewards, performance appraisal, internal communication, involvement, equal opportunities, employment security, and prestige") on employees' TOI. Joarder and Sharif's (2011) Bangladesh study noted that HR practices and provisions such as supervisory support, rewards and assurance of job security are strong determinants of TOI. Da Silva and Shinyashiki (2014) concluded that HR practices ("recruitment and selection, benefits, and training and development") are linked significantly to TOI. But compensation, integration and performance are not. Aburummana *et al.* (2020) (in Jordan) demonstrated that HR practices ("compensation, performance appraisal, promotion, and training and development") negatively impact employees' TOI. Accordingly, we propose the following hypothesis:

H3. HRD has a negative influence on employees' turnover intention.

2.5 The mediating role of organizational commitment

The present study builds on past research by investigating the role of ORC in the relationship between HRD and TOI. Organizations need to adopt HRD practices leading to ORC. These, in turn, lead to decreased employee TOI (Kadiresan *et al.*, 2015). For example, training, rewards and performance appraisal are effective practices that contribute positively to ORC (Jawaad *et al.*, 2019). ORC has long been considered a valuable factor that can reduce employees' turnover by supporting their commitment to work (Labrague *et al.*, 2018). ORC is negatively related to employee turnover, meaning that when employees are highly committed to the firm, they are less inclined to quit their jobs (Ekhsan, 2019). Most management scholars (e.g. Agarwal and Sajid, 2017; Hung *et al.*, 2018; Rawashdeh and Tamimi, 2019) have confirmed that ORC strongly predicts employee TOI. Similarly, some previous studies have demonstrated ORC's significant impact on the relationship between HR practices and TOI. Nawaz and Pangil (2016) conducted a Pakistani study that found a negative association between HRD factors such as salary, performance appraisal and TOI, and a partial mediating role of ORC on HRD's components (i.e. performance appraisal, promotion, remuneration and

career growth) and TOI. In their Malaysian study, Nasurdin *et al.* (2018) indicated that performance appraisal and compensation are negatively related to TOI and decrease TOI via ORC. Juhdi *et al.* (2013) reported that the relation between HR practices and TOI is partially mediated by ORC. Kadiresan *et al.* (2015) documented that a correlation exists between HR practices (such as training and development and performance appraisals) and ORC, which, in turn, contributes to an inverse relationship with employee TOI. Accordingly, we propose this hypothesis:

H4. Organizational commitment mediates the association between HRD and turnover intention.

3. Methodology

3.1 Study instruments

This research adopted a quantitative research design with the aid of a cross-sectional survey. The items used to measure the research constructs were derived from past studies with appropriate amendments to fit the aviation industry. The research constructs include a predictor variable, HRD; a response variable, TOI; and a mediator variable, ORC.

HRD was measured with three dimensions. The training and development dimension was operationalized with a four-item scale borrowed from Tabouli *et al.* (2016) and Rawashdeh (2018). The performance appraisal dimension was operationalized with a four-item scale borrowed from Chuang and Liao (2010) and Jawaad *et al.* (2019). And the compensation dimension was operationalized with a four-item scale borrowed from Chuang and Liao (2010) and Rawashdeh and Karim (2012). It included sample items like "The company encourages employees to participate in training programs".

Three types of organizational commitment were measured: affective, continuous and normative. A nine-item scale, derived from Norm *et al.* (2017) and Rawashdeh and Tamimi (2019), was used to measure organizational commitment. It included sample items like "I would feel guilty if I left my company right now".

Employees' turnover intention was measured with an eight-item scale derived from Lum *et al.* (1998) and Santoni and Harahap (2018). It included sample items like "The current job does not satisfy my personal needs".

The researchers collected information about the participants such as gender, age, education and work experience. The study measures were based on a five-point Likert scale (strongly disagree = 1 to strongly agree = 5).

3.2 Respondents' demographic data

Before the survey, the researchers conducted a pilot test with seven participants to ensure the respondents could answer the questions quickly. Then, permission for data collection was obtained from the company's top management. Next, the researchers assured the company's and participants' confidentiality. The employees who participated were told that the data they provided would not be disclosed to third parties or their management. To protect their privacy and confidentiality, we asked them not to disclose any information that could reveal their identity, as per Podsakoff *et al.*'s (2012) suggestions. As noted earlier, this study's sample comprised flight attendants from Royal Jordanian Airlines. Data were obtained between June and July 2021. According to their human resource department, the company employed over 1,000 flight attendants. A simple random sampling technique was employed. Approximately 300 survey links were sent via email to the target respondents. Finally, 216 useful samples were collected, but some had missing information. So, only 204 valid responses were suitable for analysis, yielding a response rate of 68%. Table 1 shows the respondents' demographic breakdown and distributions.

Category	Frequency	Percentage (%)
Gender		
Male	78	38.2
Female	126	61.8
Age		
Less than 25	31	15.2
From 25 to less than 30 years	74	36.3
From 30 to less than 35 years	59	28.9
35 years and over	40	19.6
Experience		
Less than 5 years	13	6.4
From 5 to less than 10 years	62	30.4
From 10 to less than 15 years	70	34.3
15 years and over	59	28.9
Education		
Diploma and less	146	71.6
Undergraduates	58	28.4
Graduates	Non	0

Table 1. Respondents' demographic data

4. Data analysis and results

The obtained data were analyzed using a covariance-based SEM technique in IBM SPSS AMOS. The research model fit indices were tested, and then the internal consistency and validity of the constructs were diagnosed. Finally, the hypotheses testing was conducted.

4.1 Common method bias

Considering that the current study has a time horizon synonymous with a cross-sectional design, it is susceptible to common method bias (CMB). The test for CMB was executed using Harman's single-factor test, which suggests that the explained variance for any single factor should be less than 50% (Riley *et al.*, 2018). We used IBM SPSS to extract one factor, and the results showed that the total variance explained for the single factor was 40%. This result indicates the current data are not significantly influenced by CMB (Tamura *et al.*, 2019).

4.2 Reliability and validity

The average variance extracted (AVE) indicator with a coefficient above 0.50 was utilized to establish convergent validity (Albayrak *et al.*, 2020). Discriminant validity was tested using the square root of AVE values, which should be greater than the correlation coefficients between any pair of the predictor variables (Butt *et al.*, 2021). The results in Table 1 show acceptable values of AVE – 0.672, 0.721 and 0.824 – and acceptable values of discriminant validity, that is, the square root of AVE values exceeded the highest correlation coefficients between constructs (0.541), as can be seen in Table 2.

Internal consistency reliability was measured using Cronbach's alpha (α), composite reliability (CR) and McDonald's omega ($\boldsymbol{\omega}$), with a threshold value of 0.70 (Akhtar *et al.*, 2021; Marchena-Giráldez *et al.*, 2021). The results in Table 1 showed acceptable values of reliabilities. CR values were 0.885, 0.933 and 0.859; Cronbach's alpha coefficients were 0.832, 0.918 and 0.777; and McDonald's Omega values were 0.835, 0.919 and 0.790.

4.3 Descriptive statistics, correlations and multicollinearity

Descriptive statistics illustrated in Table 3, measured by means and standard deviations (SD), show moderate levels of HRD ($M = 2.96$, SD = 0.753), ORC ($M = 3.02$, SD = 0.880) and TOI

Components	Items	Factor loadings	Validity AVE	Validity √AVE	Validity CR	Reliability α	Reliability ω
Human resource development	HRD1	0.797	0.721	0.849	0.885	0.832	0.835
	HRD2	0.850					
	HRD3	0.897					
Organizational commitment	ORC1	0.917	0.824	0.908	0.933	0.918	0.919
	ORC2	0.926					
	ORC3	0.879					
Turnover intention	TOI1	0.882	0.672	0.820	0.859	0.777	0.790
	TOI2	0.849					
	TOI3	0.719					

Note(s): KMO = 0.755; approx. chi-square = 967.156, df = 36, Sig. = 0.000
Extraction method: principal component analysis
Rotation method: varimax with Kaiser normalization

Table 2.
Results of validity and reliability testing

Constructs	Mean	SD	(1)	(2)	(3)	Tol	VIF
(1) HRD	2.96	0.753	1			0.910	1.099
(2) Organizational commitment	3.02	0.880	0.300**	1		0.910	1.099
(3) Turnover intention	3.18	0.719	−0.252**	−0.292**	1	–	–

Note(s): **Correlation is significant at the 0.01 level (2-tailed)

Table 3.
Descriptive statistics, correlations and multicollinearity

(M = 3.18, SD = 0.719). Concerning the Pearson correlation coefficients, according to the results in Table 3, HRD has a significant and positive relationship with ORC (r = 0.300, $\rho < 0.001$) and a negative relationship with TOI (r = −0.252, $\rho < 0.001$). ORC has a negative and significant relationship with TOI (r = −0.292, $\rho < 0.001$). In Table 3, the collinearity statistics, as measured by tolerance (Tol) and the variance inflation factor (VIF), indicate that the current data are free from multicollinearity because the tolerance values exceeded 0.4, and the VIF values were less than 2.5 (Adeboye *et al.*, 2014).

4.4 Model fit

Four indices were used to test model fit: the CMIN/DF ("relative chi-square"), *GFI* ("the goodness of fit index"), *CFI* ("the comparative fit index"), *and RMSEA* ("the root mean squared approximation of error"). Results in Figure 1 indicate that the research's structural model fits the current data well, that is, CMIN/DF = 1.328, which is less than 3 (Porcel-Gálvez *et al.*, 2018), GFI = 0.967 and CFI = 0.992, which are higher than 0.90 (Haney *et al.*, 2019), and RMSEA = 0.040, which exceeds 0.08 (Soto and Rojas, 2019).

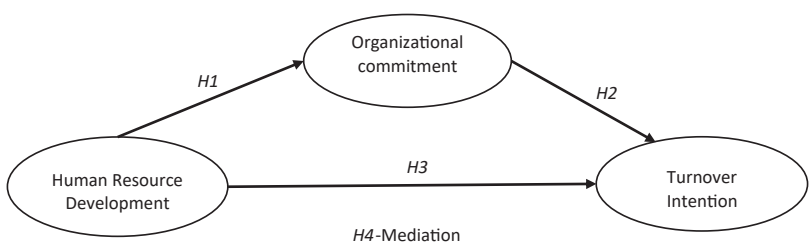

Figure 1.
Conceptual model

4.5 Hypotheses testing

The findings illustrated in Table 3 and Figure 2 indicate the direct positive effect of HRD on ORC ($\beta = 0.311$, $\rho < 0.001$), meaning that a 100% increase in HRD perception by flight attendants will result in a 31.1% increase in ORC. Hence, *H1 is supported*.

ORC has a direct negative and significant effect on TOI ($\beta = -0.271$, $\rho < 0.001$). This effect means that a 100% increase in flight attendants' ORC will result in a 27.1% decrease in TOI. Hence, *H2 is supported*.

HRD has a significant and direct negative influence on employee's TOI ($\beta = -0.175$, $\rho = 0.046$), meaning that a 100% increase in HRD perception by flight attendants will result in a 17.5% decrease in TOI. Hence, *H3 is supported*.

Accordingly, the results demonstrate a negative total effect of HRD on employee's TOI ($\beta = -0.259$, $\rho = 0.001$) and a negative indirect effect of HRD on TOI ($\beta = -0.084$, $\rho = 0.002$), meaning that the impact of HRD on TOI is mediated negatively by ORC. Hence, *H4 is supported* (see Table 4).

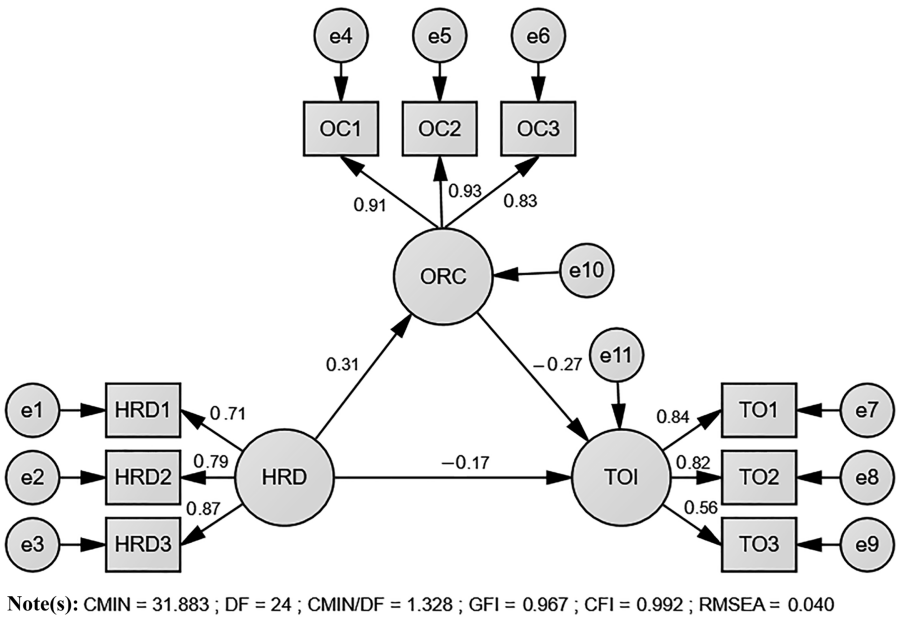

Figure 2.
Research structural model

Hypos	Structural paths			Total effects β	Total effects P	Direct effects β	Direct effects P	Indirect effects β	Indirect effects P
H1	HRD	→	Organizational commitment	0.311	0.000	0.311	0.000	–	–
H2	Organizational commitment	→	Turnover intention	−0.271	0.002	−0.271	0.002	–	–
H3	HRD	→	Turnover intention	−0.259	0.001	−0.175	0.46	−0.084	0.002

Table 4.
Results of hypotheses testing

5. Discussion

This current investigation is motivated by a lack of research exclusively focused on the nexus between HRD, TOI and ORC in the aviation industry and the failure to recognize HRD's implications for ORC and turnover by practitioners. Specifically, this research investigates HRD's effect on flight attendants' TOI through the intervening role of ORC in a developing country context. All the proposed hypothesized associations received empirical support. Discussion of the findings in light of their theoretical and managerial implications appears in the succeeding sections.

5.1 Theoretical implications

This study's results make multiple contributions to the body of knowledge in HRD, ORC and TOI. It generates four distinct, valuable implications for theory and research for aviation management literature.

First, HRD has a positive effect on ORC. This effect implies that the employee who perceives HRD availability in the company positively is more interested in continuing to work for the company. Also, this means that Royal Jordanian Airlines has a fair HRD system, one designed to support individuals' commitment. This result proved that HRD factors (training and development, compensation and performance appraisal) have collectively produced high levels of employee commitment. The current finding is not just consistent with Fihla and Chinyamurindi's (2018) claims, which linked HRD with higher levels of ORC. It also complements the relationship between HRD and ORC among flight attendants in a developing country's aviation industry. According to Nawaz and Pangil's (2016) research, HRD can influence employees' attitudes positively, leading to a high level of ORC. Kareem and Hussein (2019) indicate that HRD can provide some benefits, such as the knowledge, skills and ability needed to accomplish one's job, which will increase one's likeliness to stay with the firm.

Second, the result shows that ORC has a negative influence on employees' TOI. Most past studies support this study's finding that ORC negatively affects TOI (Hung *et al.*, 2018; Rawashdeh and Tamimi, 2019; Ekhsan, 2019). Sources of employees' commitment come in various forms, that is,. when employees have strong emotional attachment and identification with their organizations or feel obliged to repay and reciprocate favors conferred by their organizations. They tend to exhibit higher levels of commitment that reduce their inclination to quit (Bonds, 2017; Ekhsan, 2019; Hung *et al.*, 2018; Labrague *et al.*, 2018). The current study has contributed to the literature on this relationship in a developing country's aviation industry and flight attendants' perspectives.

Third, HRD has a negative direct and indirect effect on employee TOI. Employees have career and growth aspirations. HRD practices help fulfill these aspirations by creating a climate of concern, care, fairness and learning and development opportunities. Employees who have a feeling of obligation and attachment to their employer are less prone to engage in TOI. The current finding is consistent with past outcomes. For instance, Nawaz and Pangil (2016) state that investment in HRD can produce high ORC and lower rates of TOI. And the effective implementation of HR practices by firms has been shown to enhance individuals' skills and capabilities, reducing TOI (Mira *et al.*, 2019). The current work studies the presence and texture of the relationship between HRD and TOI in a developing country's aviation industry and from flight attendants' perspectives.

Finally, ORC mediated the relationship between HRD and TOI. This finding follows the prevailing SET theory (Blau, 1964), which carries the fundamental assumption that organizational practices can install a sense of obligation and reciprocity, further influencing employees' attitudes and behaviors. This study demonstrates that employees were committed because Royal Jordanian Airlines has a fair HRD system. This high level of commitment resulted in lower levels of TOI because its employees appear to be highly

attached to their organization. Nawaz and Pangil (2016) delineated the vital role of ORC as a mediator between HRD and TOI. Evidence from past research supports this study's results, which claimed that HRD, via ORC, negatively affected TOI (e.g. Juhdi *et al.*, 2013; Kadiresan *et al.*, 2015).

5.2 Managerial implications

The aviation industry is constantly plagued with high staff turnover, resulting in the high labor costs of recruiting and training new replacements. The present study has several responsive implications for managers in the industry. Employee ORC is vital for most organizations (given its usefulness in the sustainability of work activities and outcomes), resulting in increased productivity. Its findings show how HRD functions as a resource and medium that aviation industry managers can capitalize on to nurture ORC. The vital managerial implications of this study concern the role of HRD on critical employees and work outcomes. Organizations that invest in HRD activities tend to nourish their workforce commitment through increased attachment and identification, a sense of obligation and growth opportunities. As considerable resource investment is required to retain employees, the findings suggest that investment in HRD could function as a buffer for TOI. Supportive HRD practices contribute to employees' desires to remain. Employees are less likely to leave if they believe that their employer is supportive and fair, and is objective on compensation and performance appraisals. Multilateral efforts may be beneficial to reduce TOI. So, managers should invest in HRD to foster ORC among their workforce to reduce undesirable work outcomes, such as TOI.

5.3 Limitations, future studies and implications

This study has some limitations. First, only three HRD factors were examined in this research. Given that HRD has various forms of conceptualization with diverse factors, future research work may incorporate and investigate other factors, such as promotion and career planning (Uddin *et al.*, 2016). Second, the collected data originated from flight attendants in the aviation industry and a single country (Jordan), limiting the researcher's ability to generalize the results to other industries and countries. Additional research is required in other sectors in Jordan and worldwide. Third, besides ORC, other attitudinal variables that can function as valuable mediators in the relationship between HRD and TOI should be investigated. For instance, upcoming studies could involve mediating variables, such as career growth and organizational engagement, which might explain the hypothesized relationships better.

5.4 Conclusion

In the current study of an aviation company in Jordan, the influence of HRD on TOI through the indirect effects of ORC was scrutinized. HRD negatively impacted TOI and positively affected ORC, which, in turn, impacts TOI negatively. The findings delineate the indirect effect of HRD on TOI through ORC. This research's findings are consistent with theory and past findings. The results suggest that flight attendants from Royal Jordanian Airlines are likely to show lesser commitment and substantial TOI when they feel their HRD practices are poor. These results may guide airline managers and policymakers to develop retention strategies to minimize TOI.

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Appendix
List of survey items

No	Item	Strongly agree 5	Agree 4	Neutral 3	Disagree 2	Strongly disagree 1
Human resource development						
Training and development						
1	The company plans ahead for the training programs					
2	The company uses new approaches for training programs					
3	The company encourages employees to participate in training programs					
4	The company increases the personal and career-related benefits of training					
Compensation						
5	The company is concerned about employees' needs					
6	The company uses fair incentive system					
7	The company provides employees with the type of benefits they need					
8	The company uses compensation programs based on performance					
Appraisal						
9	The company evaluation system is fair					
10	The company handles the employees' complaints					
11	The company supports employees' development					
12	The company considers employees' accountable for their work					
Organizational commitment						
13	I really feel as if this company's problems are my own					
14	I do not feel "emotionally attached" to this company					
15	I do not feel a strong sense of belonging to my company					
16	Right now, staying with my company is a matter of necessity as much as desire					
17	I feel that I have too few options to consider leaving this company					
18	One of the few negative consequences of leaving this company would be the scarcity of available alternatives					
19	I do not feel any obligation to remain with my company					
20	I would feel guilty if I left my company right now					
21	This company deserves my loyalty					

(*continued*)

No	Item	Strongly agree 5	Agree 4	Neutral 3	Disagree 2	Strongly disagree 1
Turnover intention						
22	Availability of alternative better paying jobs					
23	Workplace is unhealthy work environment					
24	Insufficient salary and benefits					
25	Lack of promotions and clarity in procedures for promotions					
26	Lack of career development opportunities					
27	Lack of recognition for better performing staffs					
28	The current job does not satisfy my personal needs					
29	I am not given the opportunity at work to achieve my personal work-related goals					

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