

Examining Factor Analysis Results of Customers' Experiences With the Banking Electronic Services (CEBES) Scale: Evidence From the Saudi Retail Banking Industry

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ABSTRACT

This article examines the validity of a newly developed research instrument, the Customers' Experience of Banking e-Services (CEBES) scale. The study was conducted in Saudi Arabia during the COVID-19 pandemic; it used both exploratory and confirmatory factor analysis to measure the original 75-item scale. A convenience sampling technique was used to select 555 electronic banking services customers. Exploratory factor analysis yielded a four-factor, 54-item scale, which was run with a cutoff point of .5 to ensure high proportional contribution of each scale item. The four factors were: reflections on bank processing of complaints; recovery of e-banking services; bank webpages; and perceived safety and confidentiality of information. The newly developed scale could be used to measure customers' experience of banking e-service and identify areas requiring improvement. Despite achieving an acceptable level of statistical strength, the 54-item CEBES requires further testing on other populations.

KEYWORDS

COVID-19 Pandemic, Customers' Experiences, Electronic Banking Services, Factor Analysis, Saudi Arabia

EXAMINING FACTOR ANALYSIS RESULTS OF CUSTOMERS' EXPERIENCE WITH THE BANKING ELECTRONIC SERVICES SCALE: EVIDENCE FROM THE SAUDI RETAIL BANKING INDUSTRY

Electronic banking services (e-services) have become an acceptable alternative to bank services requiring the physical presence of customers (Thusi & Maduku, 2020). This became particularly apparent during the COVID-19 pandemic that affected countries worldwide, including Saudi Arabia (Alharthi, 2023a; Marcu, 2021). In response to the pandemic, several banks adopted new e-services and improved existing ones; these actions complied with precautionary standards introduced to minimize movement of people and decrease the spread of the virus (Chavda, 2021; Kozak, 2021). The successful growth of e-services, for any bank, depends heavily on client confidence; when using electronic services, customers need to believe their funds are secure (Chowdhury et al., 2022; Ozuem et al., 2021). During the COVID lockdowns, e-services provided individuals and families with a reliable method for making essential purchases, such as food supplies (Akhtar et al., 2020; olak & Öztekin, 2021). Some customers, however, had negative experiences; for example, some banks did

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not provide user-friendly webpages, nor easy-to-follow steps to access services or carry out tasks (Dat & Hang, 2021; Korzeb & Niedziółka, 2020). These factors adversely influenced whether clients retained their banks' services.

Saudi banks are increasingly adopting electronic banking services, especially as there are fewer than seven years remaining to achieve Saudi Vision 2030 (Alharthi, 2023a). For this reason, Alharthi (2023a) and (2023b) developed the Customers' Experience of Banking e-Services (CEBES) scale. This scale measures Saudi e-banking customers' experience of online banking services and explores factors influencing those experiences. Validation of this scale could assist Saudi, regional, and international banking industries with identifying factors most likely to influence customers' attitudes toward electronic services, and thus address a topic of interest to banking systems worldwide.

For decades, electronic services in Saudi Arabia have been an essential component of banking services provided to all citizens. However, despite having made significant improvements over the last few years, many customers are still unsure about the safety and security of the e-services provided by their local banks (Alharthi, 2023a). According to Alharthi, (2023b), this skepticism results from factors concerning internet security, and the methods utilized by bank servers to safeguard customer accounts. As most financial transactions are now dependent on online or mobile banking, e-services are increasingly necessary—they not only allow clients to run their businesses more efficiently, but by eliminating travel, they save time on banking tasks. A cashless monetary transaction could be seen as a reasonably acceptable and risk-free endeavor of which many banking customers would be in favor. Not all customers have exhibited the same level of satisfaction or the same inclination to adopt e-services, however, as evidenced by the number of people who continue to conduct a significant number of their financial transactions by physically visiting a bank. This issue is evident in Saudi Arabia, despite efforts to promote banking e-services and provide an effective substitute for in-person transactions.

This study has examined the validity of the CEBES scale, facilitating future research by examining customers' experience with e-services. It is hoped that this study will help to improve e-services and increase the number of customers making use of them.

LITERATURE REVIEW

In the Saudi market, electronic banking services are essential to managing individuals' lives, and therefore the banking industry has significantly improved its services over the past few years. In the 1960s, e-banking services first garnered customer attention with Automated Teller Machines (Lin et al., 2020). This was followed by developments ranging from electronic billing to mobile financial services—but with their evolution, problems also emerged. Some concerns involved security, safety, and customer confidentiality, while others highlighted customer satisfaction regarding service quality—including the handling of complaints and feedback (Chen et al., 2012). Accordingly, security network banking began operating online during the mid-1990s (Lin et al., 2020). Based on the fear raised by many customers, and the variation in degrees of client investment in e-banking services, researchers have examined what factors influence customer decision-making when choosing one e-service over another. These analyses are documented to provide evidence that may assist policymakers and stakeholders in further improving customer experience and usage of electronic banking services.

Factors Influencing Customer E-Banking Services

Despite being widely adopted, and having run successfully for decades, e-banking services are still viewed by some customers as high risk—information leakage, hacking, burglary, and so on (Kim et al., 2010). This perception is understandable, as the Saudi legal system does not usually have the upper hand when it comes to various illegal online actions.

Although issues regarding customer fears exist, there are additional factors influencing customers' inconsistent use of services (Liao et al., 2016). Service delays, unanswered client questions, repeated requests for different security codes and passwords, failure to recognize passwords from a single step, all play their part in making it difficult for some clients to fully utilize e-banking services (Alalwan et al., 2018; Ozuem et al., 2021).

For Saudi Banks, it is paramount to gain a comprehensive understanding of customers' experience with electronic banking services, to not only improve customer loyalty, but enhance client experience and improve future services (Merhi et al., 2019). Measuring the aggregate results of customer satisfaction from a single perspective does not provide an accurate reflection of customer e-banking experience. The CEBES is a measure that has passed meticulous statistical and conceptual processes, and therefore can improve on the limitations commonly associated with e-banking.

Researchers have examined several factors influencing customer experience and decision-making regarding e-banking as a reasonable, round-the-clock, practical alternative to conventional banking services. These factors include: information processing and service quality, both of which address the ways bank employees and service software programs handle reports; as well as actual service failures and customer experience with e-services (Almaiah et al., 2022; Harun et al., 2019; Rather et al., 2018; Shams et al., 2020). Mathew et al. (2020), and Yung and Seok (2017), have examined the additional factor of perceived fairness regarding the handling of customer complaints and suggestions. Asad et al. (2016), and Eneji et al. (2017) have analyzed security and safety issues, as perceived by customers. The speed and quality of e-service recovery may also influence banking choices, including the perceived outcome of the recovery effort made by the bank (Anouze & Alamro, 2020; Kaur & Arora, 2021). Chauhan et al. (2019) emphasize the importance of having clear, accountable communication channels connecting customers with employees responsible for e-service banking failure processing. Aboobucker and Bao (2018) argue that the overall satisfaction of customers can be enhanced by addressing moderating factors, such as: security protocols for safeguarding customer information; the trust relationship between the customer and the service provider; and the degree to which the bank websites are user-friendly. Each of these factors influence the quality of customer experience with e-banking services and could potentially influence decisions regarding not only which service to use, but even whether to choose a different banking provider.

The CEBES addresses the concerns and findings in the current literature and has achieved statistical significance from previous steps (see Alharthi, 2023a, 2023b). Additionally, this model has undergone a detailed process of statistical testing and scrutiny—only factors that contributed significantly to the interpretation of the construct, such as customer experience with e-banking services, were included in the final model. This article proposes, therefore, that the CEBES is a valid scale, able to comprehensively measure customers' e-banking experiences.

STUDY AIM AND HYPOTHESES

The aim of this study was to test the validity of the CEBES scale in Saudi banks, with the following hypotheses:

- H₁: CEBES is a valid scale that measures customers' e-banking experiences;
- H₂: The 75 items within the ten factors of the CEBES scale have a significant impact on customers' experiences with e-banking services.

METHODS

Design

This cross-sectional study used the newly developed CEBES scale, developed by Alharthi (2023a, 2023b), to examine the validity of customers' experiences with banking e-services in Saudi Arabia.

Sample

As reported in earlier research (Alharthi, 2023a, 2023b), a structured questionnaire was used to collect data from 555 respondents, all of whom had experienced e-services failure and had agreed to participate in the study (Harun et al., 2019). The study sample was selected using a convenience sampling technique. This type of sampling was used to recruit participants who had used e-banking; these individuals were then asked whether they were interested in participating in a study that solicited their opinions and thoughts on improving these services. Convenience sampling is efficient, commonly used, simple to implement, and cost-effective—well-suited to recruiting an appropriate number of individuals (Acharya et al., 2013; Jager et al., 2017). The required sample size was estimated using the statistical software G*Power V3. The following values were considered here: power 0.8; effect size 0.3; and significance level 0.05. The results demonstrated a required sample size of 178 participants, to achieve the required power using the analysis of variance (ANOVA) tests (Faul et al., 2009). A full description of the recruitment process is given in Alharthi (2023b).

Instrument

The CEBES questionnaire contained two sections. The first section covered the demographic variables of age, gender, educational qualifications, occupation, experience of e-services failures, and income. The second section contained 75 items related to ten themes; responses could be rated on a scale ranging from 1 (strongly disagree) to 5 (strongly agree) (Alharthi, 2023a). Both content and face validity were measured, and the results showed high values for both types of validity (Alharthi, 2023a).

Data Analysis

Data were analyzed using SPSS® Amos Version 22 (SPSS@IBM). The central tendency, descriptive statistics, and distribution of scores for the items related to the CEBES scale have been examined and reported in earlier work (Alharthi, 2023a, 2023b). The internal consistency of the CEBES scale and normality were assessed using specialized tests, including the Kolmogorov–Smirnov goodness of fit test and the Q–Q probability plot. An exploratory factor analysis (EFA) and confirmatory factor analysis (CFA) were adopted to determine the number of factors (dimensions), and goodness of fit model items related to the CEBES scale that were statistically valid. The EFA results formed the *a priori* theoretical basis for the CFA. The adopted cutoff point for significant item loadings for the EFA and CFA was .50 (Field, 2005).

RESULTS

Demographic Profile

The demographic profiles of customers who responded to the study questionnaire are shown in Table 1. The customers were primarily males (76%), aged between 19 and 67 years. Most customers held an academic degree from a university and were either employed or retired. Most described their economic status as middle or higher income and said that they had more than ten years of experience with the Saudi banking system.

Table 1. Customer demographic profile (n = 555)

		N	%
Gender	Male	422	76.0
	Female	133	24.0
Age	18–23 years	25	4.5
	24–35 years	36	6.5
	36–45 years	147	26.5
	46–55 years	182	32.8
	Above 55 years	165	29.7
Highest degree or level of education	High school	75	13.5
	Diploma	41	7.4
	Bachelor’s degree	288	51.9
	Master’s degree	96	17.3
	PhD degree	55	9.9
Employment status	Student	20	3.6
	Employed	294	53.0
	Self-employed	25	4.5
	Retired	211	38.0
	Homemaker	5	0.9
Economic status	High income	70	12.6
	Middle income	425	76.6
	Low income	60	10.8
Experience with e-bank as a customer	Less than 5 years	30	5.4
	5–10 years	41	7.4
	Above 10 years	484	87.2

Data and Factor Analysis

The central tendency, descriptive statistics, and distribution of the scores on the 75-item CEBES scale were examined. The scale’s internal consistency was .986, which was measured using Cronbach’s alpha (Alharthi, 2023a). An EFA was then used on the CEBES scale, with a .50 cutoff point adopted for significant item loadings, which is an accepted cutoff point for this type of study (Tabachnick & Fidell, 2013).

An EFA was performed on the original 75 items. The first twelve items reflected more than 77% of the total variance, with each value being equal to or more than 1 (Alharthi, 2023b). The Kaiser–Meyer–Olkin measure of sampling adequacy returned a value of .878, indicating sampling adequacy for each variable in the model, and for the complete model (De Smedt et al., 2013). Bartlett’s test of sphericity showed that the correlations between the items were adequate, and the highest value achieved on the matrix was [.21] with a chi-square of 61826.96 and a *p*-value of > .001 (Alharthi, 2023b). All but 21 of the items had values above the cutoff point of .50; the 21 items below the cutoff are shown in Table 2.

The EFA indicated a four-factor solution explained by 54 items (Table 3). These factors were as follows: (1) Reflections on the bank’s processing of complaints; (2) Recovery of e-banking services;

Table 2. Items achieving values below the cutoff point of .50

N	Items
1	The recovery transaction process is safe and secure.
2	I intend to continue using my bank.
3	The service provider could offer solutions to my problems.
4	Service recovery personnel offered appropriate compensation for the failure.
5	The recovery e-services are fast.
6	It took me a short period to submit my complaint.
7	Feedback on any bank transaction is sent to my email/phone immediately.
8	Information provided by the bank's service personnel is accurate.
9	The magnitude of service failure is limited in my bank.
10	The bank's reputation influenced my choice to use banking e-services.
11	The process of reporting a complaint is clear to me.
12	The online/phone banking service personnel clearly understood my issue.
13	The information provided comes from trustworthy service personnel/web pages.
14	The service provider listened attentively to understand my concern.
15	My family used banking e-services even before the COVID-19 lockdown.
16	The service provider was polite and empathetic.
17	The backup of customer information is well-maintained for any emergency shutdown.
18	The service provider of the bank offered me an apology for the service failure.
19	The bank shows me the respect I deserve when I ask for online/phone assistance.
20	The service provider acts ethically and in good faith, providing true information to the customer.
21	The e-service quality of the bank is appreciated by my friends.

(3) the bank's webpage, and (4) Perceived safety and confidentiality. Cronbach's alpha was applied to factors 1, 2, 3, 4, and the numbers for whole scale were .978, .939, .853, .925, and .981, respectively.

Confirmatory Factor Analysis

Based on the EFA results, a CFA was conducted following the maximum likelihood (IBM SPSS Amos Version 22) on a four-factor structure model distributed across 54 items. Standardized loading estimates were used in this analysis (Table 4). The CFA was conducted using the generalized weighted least squares method and an asymptotic covariance matrix. This step of CFA was used to explain the hypothesis based on the distribution of the observed factors; it was expected to improve the fitness of the adopted model and its relevant statistical tests (Thompson, 2004). There were no missing data, and various indicators of goodness of fit were considered during the analysis of the findings. A root mean square error of approximation (RMSEA) of less than .05 was considered, compared with the cutoff point adopted in the EFA. This value showed a good model fit (Bentler, 2007). The comparative fit index (CFI) and the goodness of fit index (GFI) were used to evaluate the improvement in the level or value of fit; these are more effective than a simple model that sets an assumption of independence among items on the questionnaire or scale. The GFI was used to examine whether the observed scores matched the expected scores in the hypothetical model adopted by the scale under the assumption of normal distribution (Zhang et al., 2022). These indices vary between 0 and 1; generally, values over .90 are considered acceptable.

Table 3. CEBES scale items achieving loading values above the cutoff point of .50

Factor	Item	Loading
Reflections/ customer opinion on the bank's processing of complaints	I believed the bank would solve my issue quickly.	.830
	The outcome I received was fair.	.794
	The follow-up on my case was acceptable.	.788
	I believed the bank would solve my issues fairly.	.767
	The bank's efforts resulted in a positive outcome for me.	.767
	I feel good about doing business with this bank.	.765
	The outcome I received is right.	.763
	The bank has a proper remedial mechanism in place.	.762
	I feel satisfied that the result of doing business with this bank is the best that can be achieved.	.762
	The bank provided a timely resolution to my problem.	.731
	My feelings about the bank are very positive.	.714
	The bank offered a quick review of my complaints/suggestions.	.713
	I would highly recommend this bank to other people.	.687
	The bank tries to be fair.	.673
	If I had to choose a bank all over again, I would choose my current bank.	.667
	I believe the bank shows real interest in treating me courteously.	.652
	Professional personnel handled my case.	.599
	The bank service personnel provided me with feedback on my complaints/suggestions.	.592
	The bank followed my request and updated me frequently.	.591
	The recovery process was as per my expectations.	.529
The bank treats me well.	.519	
The bank works hard to resolve service failures.	.516	
Recovery of e-banking services	Service recovery actions met my expectations.	.813
	Service recovery and mitigation steps were simple.	.763
	Service recovery actions by the bank personnel were prompt.	.760
	Service recovery was speedy and timely.	.746
	The bank personnel informed me about the service recovery process.	.730
	The bank asked about my satisfaction with the service failure follow-up process.	.719
	Service recovery personnel displayed courtesy in their responses.	.712
	Service recovery personnel were honest about the problem and the solution.	.701
	I felt that the service recovery was satisfactory.	.698
	The bank personnel followed up by sending me the service failure report.	.695
	I have advised a close friend/relative to use e-banking.	.560
	It was easy for me to make a complaint.	.530

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Table 3. Continued

Factor	Item	Loading
Banking webpages	The bank's webpages are user-friendly.	.711
	Information provided by the bank's webpages is relevant.	.686
	Instructions on the bank's webpages are easy to follow.	.646
Perceived safety and confidentiality	E-services are a safe way to handle monetary transactions.	.684
	My information is confidential when I use online services.	.647
	The bank's e-services are a safe way to pay my bills.	.584
	My key information (e.g., passwords) is safe.	.558
	I did not experience any phishing during my e-banking experience.	.523
	My previous experience with bank e-services influenced my decision to use these services.	.522
	It is safe to open a new account via online services.	.506
	The e-services provided by the bank were helpful.	.632
	I pay all my bills through my bank's e-services.	.602
	Using e-services is enjoyable.	.593
	I have bought things through my bank's e-services with no issues.	.578
	When needed, my bank uses an authentication process to protect my information.	.793
	My bank uses well-protected online services.	.671
	The recovery e-services are simple.	.635
	My prior experience with e-service recovery elsewhere has been good.	.566
	The bank is ethical in its dealings with me.	.520
Government support for e-services is important.	.568	

Table 4. Confirmatory factor analysis results for the four-dimensional model of the CEBES scale

Test*	Value
Chi-square	18736.647 ($p < .001$)
RMSEA	0.034
CFI	.534
GFI	.432
AGFI	.941
RMR	.031
IFI	.535
TLI	.515
NFI	.517
RFI	.498
ECVI	4.975
AIC	2756.000

Note. *RMSEA: root mean square error of approximation; CFI: comparative fit index; GFI: goodness of fit index; AGFI: adjusted goodness of fit index; RMR: root mean square residuals; IFI: incremental fit index; TLI: Tucker-Lewis index; NFI: normal fit index; RFI: residuals based fit index; ECVI: expected cross-validation index; AIC: Akaike information criterion.

The root mean square residual (RMR) is the square root of the discrepancy between the sample covariance matrix and the model covariance matrix (Hooper et al., 2008). The standardized RMR removes this difficulty in interpretation; it ranges between 0 and 1, and a value of .08 or less indicates an acceptable model. The expected cross-validation index (ECVI) was used to compare the output model; a low value indicates a good model fit (Kéry & Royle, 2016). In addition, the Akaike information criterion (AIC) was used to examine the likelihood function based on the number of parameters in the model. In this model, a low AIC indicates a plausible finding (Turney, 2023). The AIC examines the relative quality of the adopted model for a set of data; it acts as a basic trade-off between the model's GFI and its complex nature (Turney, 2023). In other words, the AIC's basic theoretical structure measures the amount of data loss obtained by the model, thereby providing an approximation of the true underlying distribution of the data.

In this model, the RMSEA was .038, which was used to estimate the discrepancy between the model and the data based on the degree of freedom for the proposed model (Brown & Moore, 2012). A value less than .05 constitutes a good fit, a value between .05 and .08 constitutes an acceptable fit, and a value from .08 to 1.0 constitutes a marginal or poor fit (Kéry & Royle, 2016). The RMSEA fit index confirms confidence intervals, providing the researcher with values that can be arranged and used to compare a series of models with varying numbers of factors. In the present model, all values had an acceptable goodness of fit because the CFI and GFI were above 40 (Gatignon, 2014). Within the adjusted GFI, the incremental fit index and the Tucker–Lewis index were above .90, indicating a good model fit (Gatignon, 2014). Although the p -value was significant, representing a poor fit on the chi-square measurement, the remaining values were significant (chi-square = 18736.647; degrees of freedom = 1274; probability value = .000). The number of distinct sample moments was 1378, the number of distinct parameters to be estimated was 104, and the degree of freedom (1378 – 104) was 1274. Therefore, it can be concluded that this model represented a good fit (Kline, 2010). The 54 items loaded adequately on the late factor, and thus all items were kept within the proposed model (Figure 1). All correlations among the dimensions were between .684 and .697 ($p < .001$).

Table 5 shows that the estimated output of the fit for the four-factor model resulted in a CFA being run on the 54 items. The 54 items of the previous EFA model are greater than the cutoff of .50, which is a statistically significant result that needs to include all the items in the CFA model.

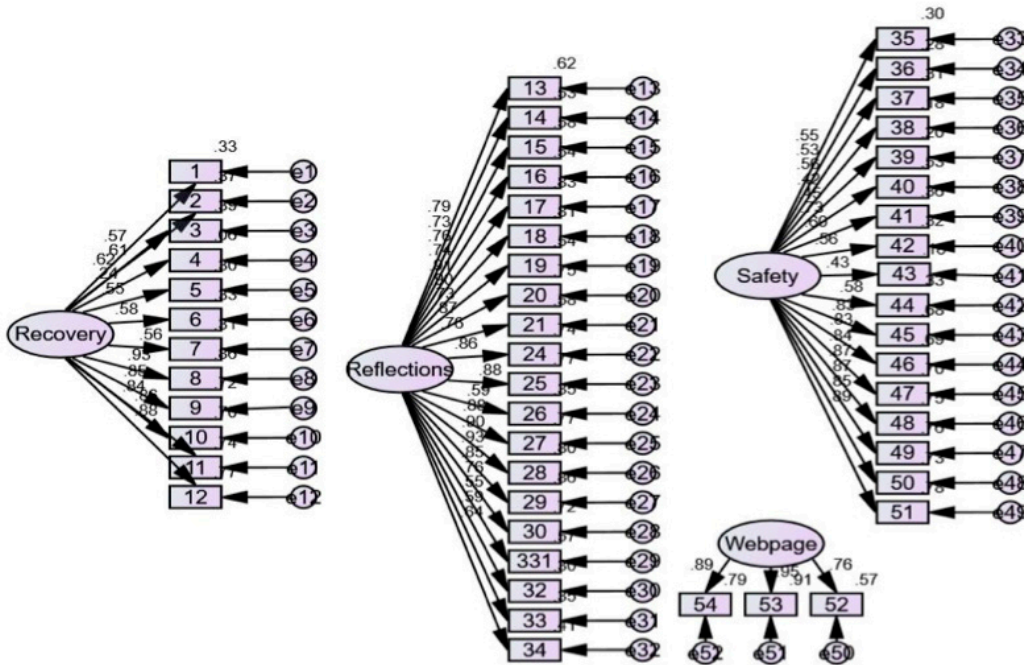
Structural Equation Modeling Results

To determine the results previously obtained by Alharthi (2023a), convergent and discriminant validity were measured for the four-factor model. In addition, the average variance extracted (AVE), which defines both the convergent validity and discriminant validity, was measured on the data. The square root of the AVE for each of the latent variables was higher than the highest correlation with any other latent variable (the AVE ranged between .687 and .846). Therefore, structural equation modeling could be conducted on the current model to test the hypotheses. All composite reliability (CR) values were above the critical value range of –1.96 to 1.96, indicating significant values (Table 6).

Despite the validation of the 54-item (modified) CEBES scale, both tested hypotheses (H_1 and H_2) were rejected because the 75-item, ten-factor model did not provide adequate evidence when applying an EFA or, subsequently, a CFA. Instead, both methods of factor validation provided adequate statistical evidence using the 54-item, four-factor model. Therefore, the results of this study provided adequate evidence:

- The *Recovery* factor had a significant impact on the e-banking customer service experience, as measured by the 54-item CEBES scale;
- The *Reflection* factor had a significant impact on the e-banking customer service experience, as measured by the 54-item CEBES scale;
- The *Safety* factor had a significant impact on the e-banking customer service experience, as measured by the 54-item CEBES scale

Figure 1. Resultant model of fit for the CEBES scale



- The *Webpage* factor had a significant impact on the e-banking customer service experience, as measured by the 54-item CEBES scale.

The results of the direct effects among the proposed hypotheses are shown in both Figure 1 and Table 6. The findings demonstrate the considerable impact of all four factors on the interpretation of the e-banking customer service experience, the main construct of the study, despite having averages of less than .70. The effect of these items is limited, however, as the overall model had a good fit. In addition, the three items loading less than .50 loaded adequately in the EFA model; it was decided that it was worth keeping them to improve the validity of the CEBES scale.

DISCUSSION

This study measured the validity of the CEBES scale using two forms of factor analysis: EFA, and CFA. The result of these analyses was a 54-item, four-factor model. The study aim was met, in that the CEBES scale demonstrated a good fit model, using the four dimensions suggested by Alharthi (2023a, 2023b). After the scale had been submitted to factor analysis, the CEBES scale was found to be valid and reliable when used on the Saudi population.

This study proposes that the CEBES scale can be used and retested to improve understanding of the dimensions influencing a customer’s decision to engage in e-banking. The results for the representative study also shed light on, and can improve, managers’ understanding regarding improvements required to increase the number of customers prepared to use a greater scope of e-banking services. The psychometric properties of the CEBES scale indicated that the four dimensions were theoretically valid in their representation of the customer experience with electronic banking services. The processes used to validate this scale were extensive and rigorous, representing different methods of validation

Table 5. Standardized regression weights for the model

Item		Factor	Estimate
REC1	<---	Recovery	.574
REC2	<---	Recovery	.610
REC3	<---	Recovery	.623
REC4	<---	Recovery	.644
REC5	<---	Recovery	.554
REC6	<---	Recovery	.583
REC7	<---	Recovery	.564
REC8	<---	Recovery	.927
REC9	<---	Recovery	.848
REC10	<---	Recovery	.839
REC11	<---	Recovery	.858
REC12	<---	Recovery	.878
REF1	<---	Reflections	.787
REF2	<---	Reflections	.728
REF3	<---	Reflections	.762
REF4	<---	Reflections	.737
REF5	<---	Reflections	.912
REF6	<---	Reflections	.899
REF7	<---	Reflections	.732
REF8	<---	Reflections	.866
REF9	<---	Reflections	.759
REF12	<---	Reflections	.862
REF13	<---	Reflections	.880
REF14	<---	Reflections	.595
REF15	<---	Reflections	.879
REF16	<---	Reflections	.897
REF17	<---	Reflections	.930
REF18	<---	Reflections	.849
REF19	<---	Reflections	.554
REF20	<---	Reflections	.750
REF21	<---	Reflections	.594
REF22	<---	Reflections	.640
SAF1	<---	Safety	.554
SAF2	<---	Safety	.534
SAF3	<---	Safety	.564
SAF4	<---	Safety	.424
SAF5	<---	Safety	.453

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Table 5. Continued

Item		Factor	Estimate
SAF6	<---	Safety	.731
SAF7	<---	Safety	.604
SAF8	<---	Safety	.563
SAF9	<---	Safety	.695
SAF10	<---	Safety	.678
SAF11	<---	Safety	.434
SAF13	<---	Safety	.836
SAF14	<---	Safety	.867
SAF15	<---	Safety	.874
SAF16	<---	Safety	.855
SAF17	<---	Safety	.886
SAF12	<---	Safety	.831
WEB1	<---	Webpage	.756
WEB2	<---	Webpage	.953
WEB3	<---	Webpage	.890

(namely, EFA and CFA). The use of both the EFA and CFA resulted in a 54-item, four-factor model that best represented the customer experience with e-banking services.

As previously explained, this study has responded to the challenge posed by prior studies to examine customers' experiences and, possibly, their intention to continue using banking e-services, especially in South Asian and Middle Eastern countries such as Saudi Arabia (Al-Hattami et al., 2021; Ho et al., 2020; Jebarajakirthy & Shankar, 2021; Yuan et al., 2019). The resulting dimensions were explained by 54 items, instead of the 75 items in the original scale (Alharthi, 2023a, 2023b). The number of items that did not achieve the cutoff point in both factor analysis methods was 21. In the CFA model, only three items were loaded at a rate between .42 and .50, while the remainder were adequately loaded above .50. In the EFA, the 54 items loaded adequately, well above the cutoff point of .50. Therefore, the decision was made to keep the three items instead of removing them, as they were statistically significant and added to the explanation of the construct. These factors were: reflections on bank processing (22 items); recovery of e-banking services (12 items); bank webpages (3 items); and perceived safety and confidentiality (17 items).

After the questionnaire had been submitted to both face and content validity measures in prior research (see Alharthi, 2023a, 2023b), the processes used to validate the study were rigorous and represented different facets of validation. An EFA is used for scale validation when there is a limited theoretical basis with which to specify the dimensions and patterns of factors that explain the construct of a scale (Courtney, 2013). In this study, it was necessary to conduct an extraction of the appropriate number of contributing themes (factors) and the corresponding items (statements). This decision affects the explanation of the theory development (in our case, customers' experience of e-banking). The study findings, derived from different types of factor analysis, covered two different hypothetical premises in tool validation. This indicates that the scale is theoretically well-developed and may be adopted in other contexts (Aminayi et al., 2015).

As reported by Rahi et al. (2023), intrinsic regulation significantly determines whether a person will continue to use internet banking. This type of regulation includes items that reflect a positive experience when using banking e-services via the internet (including easy-to-use options and services),

Table 6. Structural equation model output using confirmatory factor analysis

Label			Estimate	SE	CR	p
Recovery			.226	.031	7.243	***
Reflections			.575	.052	11.082	***
Safety			.135	.020	6.859	***
REC1	<---	Recovery	1.000			***
REC2	<---	Recovery	1.031	.087	11.874	***
REC3	<---	Recovery	1.004	.083	12.068	***
REC4	<---	Recovery	.461	.085	5.440	***
REC5	<---	Recovery	.818	.075	10.960	***
REC6	<---	Recovery	.860	.075	11.411	***
REC7	<---	Recovery	1.027	.092	11.115	***
REC8	<---	Recovery	1.888	.122	15.444	***
REC9	<---	Recovery	1.823	.124	14.721	***
REC10	<---	Recovery	1.737	.119	14.631	***
REC11	<---	Recovery	1.651	.111	14.814	***
REC12	<---	Recovery	1.667	.111	15.006	***
REF1	<---	Reflections	1.000			
REF2	<---	Reflections	.902	.047	19.004	***
REF3	<---	Reflections	1.020	.051	20.136	***
REF4	<---	Reflections	.825	.043	19.302	***
REF5	<---	Reflections	1.136	.044	25.757	***
REF6	<---	Reflections	1.031	.041	25.228	***
REF7	<---	Reflections	.837	.044	19.131	***
REF8	<---	Reflections	1.041	.044	23.902	***
REF9	<---	Reflections	1.024	.051	20.024	***
REF12	<---	Reflections	1.133	.048	23.760	***
REF13	<---	Reflections	1.046	.043	24.442	***
REF14	<---	Reflections	.677	.045	14.896	***
REF15	<---	Reflections	1.177	.048	24.429	***
REF16	<---	Reflections	1.261	.050	25.116	***
REF17	<---	Reflections	1.213	.046	26.491	***
REF18	<---	Reflections	1.102	.047	23.268	***
REF19	<---	Reflections	.939	.047	19.943	***
REF20	<---	Reflections	.568	.042	13.634	***
REF21	<---	Reflections	.612	.041	14.869	***
REF22	<---	Reflections	.659	.041	16.233	***
SAF1	<---	Safety	1.000			
SAF2	<---	Safety	.985	.095	10.397	***

continued on following page

Table 6. Continued

Label			Estimate	SE	CR	<i>p</i>
SAF3	<---	Safety	1.284	.119	10.780	***
SAF4	<---	Safety	.960	.109	8.770	***
SAF5	<---	Safety	1.037	.113	9.186	***
SAF6	<---	Safety	1.641	.128	12.848	***
SAF7	<---	Safety	1.242	.110	11.322	***
SAF8	<---	Safety	1.088	.100	10.862	***
SAF9	<---	Safety	.745	.084	8.850	***
SAF10	<---	Safety	1.162	.105	11.063	***
SAF11	<---	Safety	1.925	.140	13.743	***
SAF13	<---	Safety	1.997	.144	13.827	***
SAF14	<---	Safety	1.926	.137	14.082	***
SAF15	<---	Safety	1.927	.136	14.136	***
SAF16	<---	Safety	1.789	.128	13.984	***
SAF17	<---	Safety	1.846	.130	14.228	***
SAF12	<---	Safety	2.023	.147	13.786	***
WEB1	<---	Webpage	1.000			
WEB2	<---	Webpage	1.179	.052	22.703	***
WEB3	<---	Webpage	1.160	.052	22.294	

the attractiveness of interfaces, and the service steps themselves (Akkucuk & Teuman, 2016). In addition, customers often require easy-to-follow instructions with non-repetitive information, and none of the unnecessary steps that are found in some processes (Suki, 2010; Swaid & Wigand, 2009). Managers could use the CEBES scale to create a database and thereby improve future services aimed at expanding the scope of e-banking services and increasing the number of customers who are using these services.

Future testing of the 54-item scale using independent samples from other contexts could yield robust estimates of the CEBES scale as being a reliable measuring instrument across different populations. An interesting venue for future research might be to explore the effect of cultural differences on electronic banking services within different societal contexts (Picoto & Pinto, 2020).

CONCLUSIONS

This study assessed the factor structure of the CEBES scale, which was measured using a sample population of Saudi e-banking service users. The results showed a good fit in this sample and offer beneficial implications for general national and international consensuses regarding the theoretical structure of the CEBES scale; specifically, they could allow effective reporting on items to consider when addressing customers' use of e-banking services. Elements that influence individual decisions regarding the use of electronic services include: customer experience with service recovery; satisfaction with service quality; speed of recovery following service failure; and the safety and confidentiality of customer information. All these factors should be addressed by banks to improve e-services and increase the intractability of electronic banking. The CEBES scale, as a construct, is valid and reliable when applied to the study population; however, in future research it would be worth testing how

these components might affect individuals' decisions about whether to continue using the services of a given bank.

CONFLICTS OF INTEREST

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

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