



Testing the Validity of the Proposed Electronic Marketing Model in Libyan Banking Institutions: Using Confirmatory Factor Analysis

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Article History

Received: 17.09.2024

Accepted: 24.10.2024

Published: 15.11.2024

Abstract: This study aims to develop a conceptual framework for measuring electronic marketing in banking institutions by adopting appropriate dimensions for its measurement, namely (attraction, engagement, and learning). To achieve this objective, we used Confirmatory Factor Analysis (CFA) with the AMOS software. Based on these results, the study found that this model is suitable and reliable for measuring electronic marketing in banking institutions in Libya.

Keywords: Electronic Marketing, Marketing, Marketing Policies.

Cite this article:

Elteer, F. B., (2024). Testing the Validity of the Proposed Electronic Marketing Model in Libyan Banking Institutions: Using Confirmatory Factor Analysis. *ISAR Journal of Economics and Business Management*, 2(11), 63-67.

1. Introduction

Commercial banks are among the sectors most concerned with developing electronic marketing. It is similar to other marketing concepts but differs in the means of communication with customers, relying on the internet as a fast, easy, and cost-effective way to perform all marketing activities such as advertising, sales, distribution, marketing research, new product design, and pricing.

The work environment in the banking sector is similar, but banks can be distinguished through their marketing operations and excellence. Therefore, banks strive to maintain a high level of task completion to develop work and stand out from other banks. This drives them to focus on communication and information technology to achieve their goals accurately and to increase the infrastructure of banks for effective and organized electronic marketing.

According to Porter (1990), it is the application of the internet and related digital technologies to achieve marketing goals. Rebecca (2013) states that it is the effective use and development (with a clear digital vision) of digital marketing resources (expertise, knowledge, individuals, databases, relationships, etc.) and the tools available on the internet to achieve a competitive advantage in the electronic business market. It is also defined as managing the interaction between the organization and the consumer in the virtual environment to achieve mutual benefits. Qaisar et al. (2012) defined electronic marketing as relying on the use of various communication networks to achieve customer satisfaction.

Some studies have confirmed that electronic marketing significantly contributes to achieving organizational goals and completing their plans in less time, effort, and cost by expanding

sales operations. As company sales increase, profits also increase, which leads to organizational growth and increased productivity (Sutanto, 2011; Salleh et al., 2013; Yeh et al., 2012).

Many studies have aimed to determine the dimensions of electronic marketing and its impact on marketing variables. Among these studies is Meyer et al. (2006), which identified three dimensions of electronic marketing. These dimensions have been adopted as the main measurement dimensions for precise interpretation and include:

1.1. Attraction:

This dimension is influenced by the degree of individual perception of the unique characteristics of a product or service, such as consumer autonomy and taste diversity. It is also affected by effective advertisements in marketing plans and feedback from the market (Mayer, 2006).

1.2. Engagement:

This refers to the investment value achieved by marketing when the company continues to work on the same product versus what is lost when replacing it with other products. Products with high sales levels maintain the same investment level because they are needed, not just wanted (Mayer, 2006).

1.3. Learning:

This involves conducting research and surveys with customers through effective communication channels to ensure the achievement of marketing plans. It relies on customer feedback to develop and improve services (Mayer, 2006).

2. Study Objectives

The study aims to verify the validity of the electronic marketing factor measurement as a latent variable by testing convergent validity, known as Average Variance Extracted (AVE), for each main dimension of the measurement (attraction, engagement, learning) and their representative items. It also aims to verify discriminant validity, known as Shared Variance (SV), among the dimensions to use it in correlation and impact tests with other latent factors.

3. Methodology

3.1. Population and Sample

The study population consists of customers (clients) of the Republic Bank's main branch and its branches in Tripoli, Libya, totaling 3,100 employees. An initial sample of 450 individuals was selected for analysis, with 381 valid questionnaires meeting the analysis criteria.

3.2. Research Tool

The researchers designed a questionnaire to test the construct validity of the electronic marketing factor, based on previous studies such as (Al Qasim, 2011) and (Abazaid, 2014). The first dimension, "Attraction," included 4 items. The second dimension, "Engagement," consisted of 4 items, and the third dimension, "Learning," also had 4 items. This brought the total number of items to 12 for the electronic marketing scale. The face validity (judgment) was verified by presenting it to specialized professors in this field, and the reliability was confirmed using the Cronbach's Alpha test.

3.3. Confirmatory Factor Analysis (CFA)

The researcher used Confirmatory Factor Analysis (CFA) for all parts and components of the measurement tool to verify the construct validity evidence for the study questionnaire according to its main dimensions (Attraction, Engagement, Learning). The analysis relied on the Fornell-Larcker criterion, as well as four main indicators to test its validity:

Chi-Square and Degrees of Freedom (Df) (Chi-Square): The ratio should be $(2 \leq \chi^2/df \leq 5)$ (Marsh and Hocevar, 1985).

Normed Chi-Square (Relative) (CMIN/DF): Should be $(2 \leq \chi^2/df \leq 5)$ (Marsh and Hocevar, 1985).

Comparative Fit Index (CFI): Should be greater than 0.90 (McDonald and Marsh, 1990).

Root Mean Square Error of Approximation (RMSEA): Should be less than 0.080 (Browne and Cudeck, 1993).

4. Results

4.1. Fit and Suitability Indicators for the Electronic Marketing Scale (Before Adjustment)

The results of the Confirmatory Factor Analysis, as shown in Figure (1), indicated that the scale for organizational commitment and its three dimensions was free from illogical correlations.

(Illogical Correlation), which reaches or exceeds the correct value (1), confirming that there is no problem in the confirmatory analysis for the electronic marketing scale with its three main dimensions: (Attraction, Engagement, Learning).

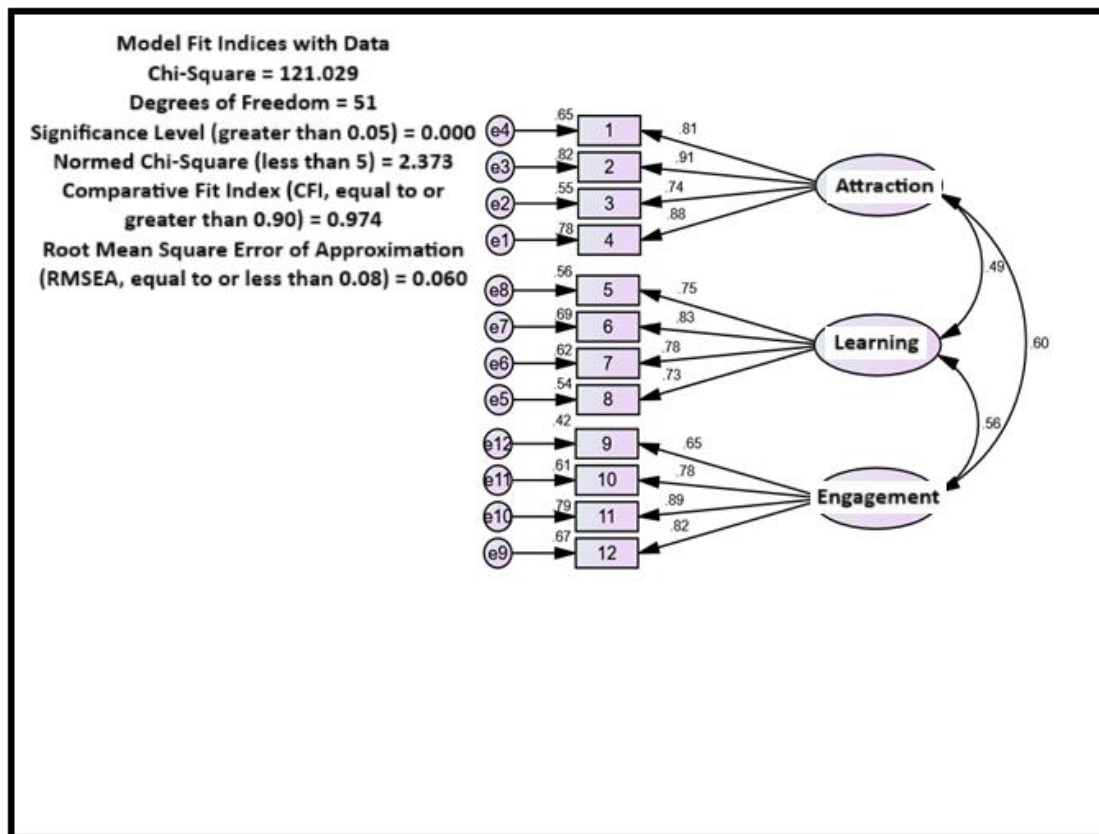


Figure (1): Confirmatory Factor Analysis (AMOS) for the Electronic Marketing Scale

Table (1): Values of Fit and Suitability Indicators for the Electronic Marketing Scale

No.	Fit Indicators	Fit Indicator Values for the Model	Value Indicating Good Fit
1	Chi-Square (cmin)	121.029	
2	Degrees of Freedom (df)	51	
3	Significance Level (p)	0.000	Non-significant
4	Normed Chi-Square (cmin/df)	2.373	Less than (5)
5	Comparative Fit Index (cfi)	0.974	Greater than (0.90)
6	Root Mean Square Error of Approximation (Rmsea)	0.060	Less than (0.08)

4.2. Results of Standardized and Unstandardized Parameters for the Organizational Commitment Scale (After Adjustment):

Examining Figure (1) of the model, the results of the standardized and unstandardized parameters revealed that the model fit indicators aligned perfectly with the specified standards. The Chi-Square value was (Cmin = 121.029), the degrees of freedom were (df = 51), and the significance level was statistically significant (P = 0.000). Additionally, the normed Chi-Square value (cmin/df) was 2.373, which did not exceed the benchmark of 5. The Comparative Fit Index (CFI) value was 0.974, higher than the benchmark of 0.90. The Root Mean Square Error of Approximation (RMSEA) value was 0.060, less than the benchmark of 0.080. All these indicators demonstrate that the electronic marketing model aligns with the study environment from which the data were collected.

Regarding the correlation relationships between the dimensions of the electronic marketing scale, as shown in Figure (1) and Table

(2), the correlations (relationships) between the dimensions of the adjusted model were all statistically significant, with the T-statistic value greater than 1.964 and the significance level (probability value) equal to P = 0.000, which was less than the benchmark of 0.05.

The correlation percentages between the dimensions within the model ranged between 0.49, the lowest correlation between the Attraction and Learning dimensions, and 0.60, the highest correlation between the Attraction and Engagement dimensions. This also indicates that the dimensions exhibited discriminant validity as all correlations avoided complete fusion and were below the critical correlation percentage (complete fusion) set at 0.90. The following table shows the results of the standardized and unstandardized estimates, T-values, significance levels, correlations, and shared variance between the dimensions of the electronic marketing scale.

Table (2): Unstandardized Estimates, T-values, Significance Levels, and Correlation Values Between the Dimensions of Electronic Marketing

No.	Latent factor	Correlation	Latent factor	Estimate	S.E.	C.R.	P	R	SV
1	Attraction	↔	Learning	0.545	0.076	7.128	0.000	0.49	0.24
2	Attraction	↔	Engagement	0.795	0.093	8.591	0.000	0.60	0.36
3	Learning	↔	Engagement	0.594	0.078	7.617	0.000	0.56	0.31

4.2.1. Results of Construct Validity Test for the First Dimension (Attraction) of the Electronic Marketing Scale

Examining Figure (1) and Table (3), it is evident that the saturation or correlation between the first dimension (Attraction) and its representative items was statistically significant. The T-statistic value for each item was greater than 1.964, and the significance level (probability value) was less than 0.001. The saturation percentage was high and excellent, exceeding the desired value of

0.50, ranging between 0.74 and 0.91, known as the Loading Factor for the Attraction dimension. The squared multiple correlation (MCS) values ranged from 0 to 0. Additionally, the average variance extracted (AVE), which should be at least 0.50 as one of the main criteria for convergent validity, was 0.70. These indicators demonstrate the dimension's strength in terms of convergent validity, making it a reliable dimension of organizational commitment.

Table (3): Unstandardized Estimates, T-values, Significance Levels, Saturation Percentage, Squared Multiple Correlation, and Average Variance Extracted for the Attraction Dimension

No.	Item	Estimate	S.E.	C.R.	P	Loading	SMC	AVE
1	The company provides attractive advertisement windows on web pages to attract customers.	1.000				0.81	0.66	0.70
2	The company relies on interactive advertisements appearing on others' websites and pages to attract and entice customers.	0.865	0.049	17.787	0.000	0.91	0.83	
3	The company uses a list of tools that are distinguished by their attractiveness in its applications and services.	1.051	0.044	24.117	0.000	0.74	0.55	
4	The company's brand reminder site in search engines contributes to attracting customer attention.	0.986	0.05	19.715	0.000	0.88	0.77	

4.2.2 Results of Construct Validity Test for the Second Dimension (Learning) of the Electronic Marketing Scale

Examining Figure (1) and Table (4), it is evident that the saturation or correlation between the second dimension (Learning) and its four representative items was statistically significant. The T-statistic value for each item was greater than 1.964, and the significance level (probability value) was less than 0.001. The saturation percentage was high and excellent, exceeding the desired

value of 0.50, ranging between 0.73 and 0.83, which confirms the convergent validity (CV) for the Learning dimension. The squared multiple correlation (MCS) values ranged from 0.53 to 0.69. The average variance extracted (AVE), which should be at least 0.50 as one of the main criteria for convergent validity, was 0.60 as shown in Table (4). These indicators demonstrate the dimension's strength in terms of convergent validity, making it a reliable dimension of electronic marketing.

Table (4): Unstandardized Estimates, T-Values, Significance Levels, Saturation Percentages, Squared Correlation, and Average Variance Extracted for the Learning Dimension

Item	Estimate	S.E.	C.R.	P	Loading	SMC	AVE
1 The company conducts research and surveys with customers through various channels.	1.000				0.75	0.56	0.60
2 The company relies on customer feedback to develop and improve its services.	1.076	0.074	14.601	0.000	0.83	0.69	
3 The company uses blogs and interactive channels to help customers experience its digital services.	1.075	0.073	14.793	0.000	0.78	0.61	
4 The company conducts research and surveys with customers through various channels.	1.055	0.078	13.471	0.000	0.73	0.53	

4.2.3 Results of Construct Validity Test for the Third Dimension (Engagement) of the Electronic Marketing Scale

Examining Figure (2) and Table (5), it is evident that the saturation or correlation between the third dimension (Engagement) and its four representative items was statistically significant. The T-statistic value for each item was greater than 1.964, and the significance level (probability value) was less than 0.001. The saturation percentage was high and excellent, exceeding the desired

value of 0.50, ranging between 0.65 and 0.89, which confirms the convergent validity (CV) for the Engagement dimension. The squared multiple correlation (MCS) values ranged from 0 to 0. The average variance extracted (AVE), which should be at least 0.50 as one of the main criteria for convergent validity, was 0.63 as shown in Table (5). These indicators demonstrate the dimension's strength in terms of convergent validity, making it a reliable dimension of electronic marketing.

Table (5): Unstandardized Estimates, T-Values, Significance Levels, Saturation Percentages, Squared Correlation, and Average Variance Extracted for the Engagement Dimension

No.	Item	Estimate	S.E.	C.R.	P	Loading	SMC	AVE
1	The company ensures the provision of a multilingual website to encourage customers to communicate and participate in completing its marketing operations.	1.000				0.65	0.42	0.63
2	The company has channels (whether website or application) that facilitate electronic booking.	1.063	0.053	20.208	0.000	0.78	0.61	
3	The company resorts to virtual communities for customers to communicate with the company and with each other.	0.936	0.057	16.364	0.000	0.89	0.79	
4	The company adopts a policy of engaging customers through digital channels in completing its marketing operations.	0.756	0.058	12.997	0.000	0.82	0.67	

4.3. Fornell-Larcker Criterion Results for the Electronic Marketing Scale

To verify the predictive validity (discriminant validity) between the dimensions of the electronic marketing scale, the researcher applied the Fornell-Larcker criterion. The average variance extracted (AVE) for each dimension in the scale must be higher than the shared variance (SV) for all relationships or correlations. Table (6) illustrates the correlations between the three dimensions of the electronic marketing scale.

Table (6): Correlation Matrix Between the Three Dimensions of the Electronic Marketing Scale

No.	Latent Variables	Attraction	Learning	Engagement
1	Attraction	1		
2	Learning	0.49	1	
3	Engagement	0.60	0.56	1

Examining Table (7), which shows the shared variance between the three dimensions (calculated as the square of the correlation value), and the same table also showing the average variance extracted (AVE), it is clear that the AVE value for each dimension representing the electronic marketing scale was higher than the shared variance (SV) among all dimensions. This indicates that the electronic marketing model met the Fornell-Larcker criterion and demonstrated discriminant validity between its three dimensions.

Table (7): Shared Variance and Average Variance Extracted Matrix for the Three Dimensions of the Electronic Marketing Scale

No.	Latent Variables	Attraction	Learning	Engagement
1	Attraction	<u>0.70</u>		
2	Learning	0.24	<u>0.60</u>	
3	Engagement	0.36	0.31	<u>0.63</u>

5. Conclusion and Discussion of Results

This research paper achieved its primary objective, which was to validate the construction of an electronic marketing scale in financial institutions (commercial banks) using Confirmatory Factor Analysis (CFA) as part of Structural Equation Modeling (SEM-AMOS). The study relied on the main dimensions for the latent factor (electronic marketing) based on several scientific studies such as Sutanto (2011), Salleh et al. (2013), Yeh et al. (2012), and Meyer et al. (2006). The results indicated the validity of the hypothetical model and its specified criteria, confirming its construction as a reliable measurement tool for assessing electronic marketing within banking institutions.

The scale demonstrated convergent validity (AVE) across its dimensions and main indicators, with all values exceeding the specified benchmark of 0.50. The study also confirmed discriminant validity among the main dimensions of the electronic marketing scale (Attraction, Engagement, Learning), as the average variance extracted (AVE) for all items was greater than the shared variance (SV) among them. This result aligns perfectly with the Fornell-Larcker criterion.

In summary, the electronic marketing scale can be relied upon as a valid measurement tool for conducting correlational studies in the future.

References

1. Al Qasim, Roui Rashid. (2011). "The Impact of Modern Marketing on Improving the Quality of Banking Services: An Applied Study on a Sample of Jordanian Commercial Banks," Master's Thesis, Department of Business Administration, Middle East University.
2. Abazaid, A. M. (2014). "The Role of Electronic Marketing in Improving Performance in the Jordanian Banking Sector," Published paper in the *Journal of Administrative Science Studies*, Vol. 41(2) 362-374.
3. Browne, M. W., & Cudeck, R. (1993). Alternative ways of assessing model fit. *Sage. Focus Editions*, 154, 136.
4. Meyer, J.P. and Allen, N.J. (2006). *Commitment in the Workplace: Theory, Research, and Application*, Thousand Oaks, Sage Publications, New York, USA, 3rd Ed.
5. McDonald, R. P., & Marsh, H. W. (1990). Choosing a multivariate model: Noncentrality and goodness of fit. *Psychological Bulletin*, 107(2), 247-255.
6. Marsh, H. W., & Hocevar, D. (1985). Application of confirmatory factor analysis to the study of self-concept: First-and higher order factor models and their invariance across groups. *Psychological bulletin*, 97(3), 562-582. <http://dx.doi.org/10.1037/0033-2909.97.3.562>
7. Qaisar, Muhammad, safdar, rahman and Mohamad Sufyan. (2012). Exploring Effect of Organizational Commitment on Employees' Performance, *Interdisciplinary Journal of Contemporary research in Business*, 3(11): 248-255.
8. Porter, M, 1990. *The Competitive Advantage of Nations*, The Free Press, A Division of McMillan, Inc., New York, p. xii.
9. Rebecca A., Stephen, G., Mahima, S., Howard M. and ShelleyM. 2013. The Influence of Organizational Commitment and Individual Competence on Performance: In the Learning Organization Perspective, *International Journal of Business and Behavioral Sciences*, 3(8): 20-36.
10. Salleh, M., Aziz, A., Shaladin, M. and Muhammad, A. 2013. Fairness of Performance Appraisal and Organizational Commitment, *Asian Social Science*; 9(2): 122-128.
11. Yeh, H., Shih, Ch. 2012. The Mediating Effect of Organizational Commitment on Leadership Type and Job Performance, *The Journal of Human Resource and Adult Learning*, 8(2): 50-59.