MODELING ONLINE SHOPPING BEHAVIOUR DURING COVID-19 USING THE TOE FRAMEWORK

Imran Batada[1,*]

Abstract

This Case Study explores the utilization of an online ordering platform run by Muller & Phipps Pakistan (M&P) during the COVID-19 lockdown. The company experienced a massive increase in online orders during the lockdown. The study explores the impact that organizational readiness (ORD), data and payment security (DPS), user satisfaction (USAT), user friendliness (UFR), and competition (COMP), have on the utilization of the online platform (UTIL). As in many other countries, the COVID-19 lockdown brought businesses in Pakistan to a complete halt, thereby putting pressure on people to resort to online purchases. Consequently, the app developed by M&P was widely used during the lockdown. This case study aims to determine the satisfaction levels of people who opted for online ordering. Data were obtained from an online survey delivered to customers who used the online ordering platform of M&P, and was used to determine their satisfaction levels. The study adopted the Technology-Organisation-Environment (TOE) framework to assess the impact of organizational readiness (ORD), data and payment security (DPS), user satisfaction (USAT), user friendliness (UFR), and competition (COMP), on utilization of the online store (UTIL). It was observed that technological factors played the most significant role in the utilization of online shopping. User satisfaction, data and payment security, and user-friendliness were found to be the most important technological factors affecting satisfaction levels.

Keywords: Organizational Readiness, Data and Payment Security, User Satisfaction, User Friendliness, and Competition.

[1,*] Dr. Imran Batada is currently working in IoBM as CTO & Director Center of Information & Technology. Before joining IoBM, Dr. Batada was associated with IBA Karachi as CIO & Director Center of Information & Communication Technology (CICT). Dr. Batada's career spans over 20 years locally and internationally in executing and managing large scale projects, strategic development, formulating policies, managing large teams, implementing ERP Projects, and carrying out research work. He obtained Doctorate in Teaching & Technology from Assumption University. He has won several awards including CIO 200 Awards by the Global CIO Forum in 2020 and the Living Legend Excellence Award by Ideal Excellence Award back in 2018. Email: imran.batada@gmail.com

INTRODUCTION

Muller & Phipps Pakistan (Pvt.) Ltd. (M&P) is the leading distribution company in Pakistan with a client base of 76 principals. M&P is involved in the Sales & Distribution business in Pakistan, dealing with consumer, healthcare, pharmaceutical, and telecommunications products, distributed through its own logistics services. The company operates more than 120 premises of M&P in Pakistan, where it stores products and later supplies them to the customers. The company runs a website called AppTak, which provides customers with a premium quality online ordering experience. M&P uses the AppTak website as an online ordering portal for booking the products that it is authorized to distribute in its portfolio. There are numerous products related to healthcare, pharmaceuticals, household, personal care, beverages, oil and lubricants, cosmetics, and smart devices on its website.

During the COVID-19 lockdown, an increase in online ordering was observed throughout Pakistan. This research study focused on exploring the utilization of M&P's online platform during the lockdown.

In this regard, the research carried out a survey across the customers of M&P, receiving a total of 651 responses. Overall, the study considered six research constructs: organizational readiness, data and payment security, user satisfaction, user friendliness, competition, and online store utilization.

LITERATURE REVIEW

Several studies looking into the adoption of online shopping have been carried out, with some of the key studies being Scupola (2009), Turban et al. (2010), Gangwar et al. (2014) and Awa et al. (2017). The current study made use of the Technology, Organisation, and Environment (TOE) theoretical framework, which is widely discussed in the literature. Tornatzky and Fletcher (1990) described the TOE as the whole process of innovation, beginning from the time innovations are developed, to the implementation of those innovations by users within the context of a firm. The TOE framework is one segment that constitutes how the company context influences the adoption and implementation of innovations. The results of these studies have been consistent concerning the principal role played by the TOE framework dimensions in adopting e-commerce solutions. The current study also modelled the key dimensions based on the TOE framework. The technological construct was measured by data and payment security (DPS), user satisfaction (USAT), and user friendliness (UFR), while the organizational construct was measured by organizational readiness (ORD). Lastly, the environmental construct was delimited to competition (COMP). Considering that the variables were found to be significant factors further attests to the importance and relevance of the TOE framework (Awa et al., 2015).

Aljowaidi, Arbia and Arabia (2015) investigated the factors influencing ecommerce adoption with findings corresponding to those of the current study. However, it is critical to note that the current study found that user satisfaction (USAT) explained the most significant variance in utilization of the online store (UTIL). This finding is important because it is consistent with the studies of Pappas et al. (2017), Tripopsakul (2018), and Cruz-Jesus, Pinheiro, and Oliveira (2019), which also argue that satisfaction from use drives further usage. The user satisfaction (USAT) variable which had the most significant impact was a technological dimension sub-construct. There is a strong parallelism between this variable and the traditional construct of perceived usefulness, popularized by Davis (1989) in the Technology Acceptance Model (TAM), along with the construct of relative advantage, popularised by Rogers (1983; 1995) and the UTAUT performance expectancy construct (Venkatesh and Davis, 2000). Based on this argument, it was confirmed that perceived usefulness, relative advantage, and performance expectancy lead to user satisfaction, ultimately improving online store utilization.

Considering that data and payment security (DPS) was the second most significant factor influencing the utilization of the online store (UTIL) is evidence of the vital role played by technological factors in a technological dimension. However, this specific construct was not proposed in the TAM model (Davis, 1989), the DOI model (Rogers, 1995), or UTAUT (Venkatesh and Davis, 2000). Therefore, this finding is important as it exposes the inadequacy of the TAM, DOI, and UTAUT models, strengthening the rationale behind the use of the TOE framework (Tornatzky and Fleischer, 1990) as the guiding framework in the current study. Studies by Chatterjee (2015), Mohtaramzadeh, Ramayah, and Jun-Hwa (2018), and Cruz-Jesus, Pinheiro, and Oliveira (2019) have established the significant role that security and perceived risk play towards the use of eCommerce solutions and cite deficiencies in the extant technology adoption theories. The validation of this relationship in this study is a key contribution to knowledge as it challenges the non-exhaustiveness of some of the time-honoured technology adoption theories.

The fact that user friendliness (UFR) is the third most significant factor indicates another strong parallelism between this construct and the construct ‘perceived ease of use’ from the TAM model (Marangunić and Granić, 2015), the construct ‘complexity’ from the DOI model (Rogers, 1995), and ‘effort expectancy’ from the UTAUT model (Venkatesh and Davis, 2000). Considering that this construct and the preceding two are all technological dimensions is a significant contribution to knowledge. The study confirms that technological factors play the most critical role in the

adoption of e-commerce and that this is regardless of the theoretical model used. A case in point is the research by Marangunić and Granić (2015), which found that the TAM model's perceived ease of use and usefulness played the most significant role in technology adoption. From a Diffusion of Innovation (DOI) perspective, Gangwar et al. (2014) also confirmed the critical role that technological factors play in the adoption of innovation. Nevertheless, this study was helpful as it embraced the environmental and organizational dimensions which are lacking in the DOI and TAM models (Venkatesh and Davis, 2000; Marangunić and Granić, 2015).

The construct of organizational readiness, an organizational attribute, was also confirmed to be significant factor, albeit, of less impact than technological dimensions. The findings show that competition, which is an environmental attribute, was the least significant factor. This finding is supported by studies such as Chen et al. (2013) which also established that organizational readiness was a key factor leading to the successful adoption and utilization of online shopping. However, this was an organizational attribute which was not measured by TAM, DOI, and UTAUT (Gangwar, Date and Ramaswamy, 2015; Bauerová and Klepek). This is a key contribution to knowledge as the finding further challenges the exhaustiveness of some of the extant technology adoption theories. The same argument was posited by Rodríguez-Ardura and Meseguer-Artola (2010), Govindaraju and Chandra (2011), Morteza and Sai (2013) and Awa, Ojiabo and Orokor (2017), who also argued that to be able to exhaustively examine the predictive constructs influencing the adoption of innovations, considering individuals in isolation was insufficient, and that the organizational and environmental contexts are also important and must be considered. Most recent studies such as Awa et al. (2015), Yu, Lin, and Liao (2017) and Hadi and Santoso (2020) place more emphasis on contextual factors such as the macro environment and organizational factors which is why this study adopted the TOE framework.

CONCEPTUAL FRAMEWORK

The conceptual framework was based on the Technology-Organization-Environment (TOE) framework of Tornatzky and Fleischer (1990). The organization dimension was measured by organizational readiness, while the second construct, technology, was measured by data and payment security, user satisfaction, and user friendliness. The third construct of environment was measured by the variable competition. Thus, this study aimed at determining whether organizational readiness, data and payment security, user satisfaction, user friendliness, and competition, influence the use of online stores. The conceptual framework linking these hypotheses is illustrated in Figure 1.

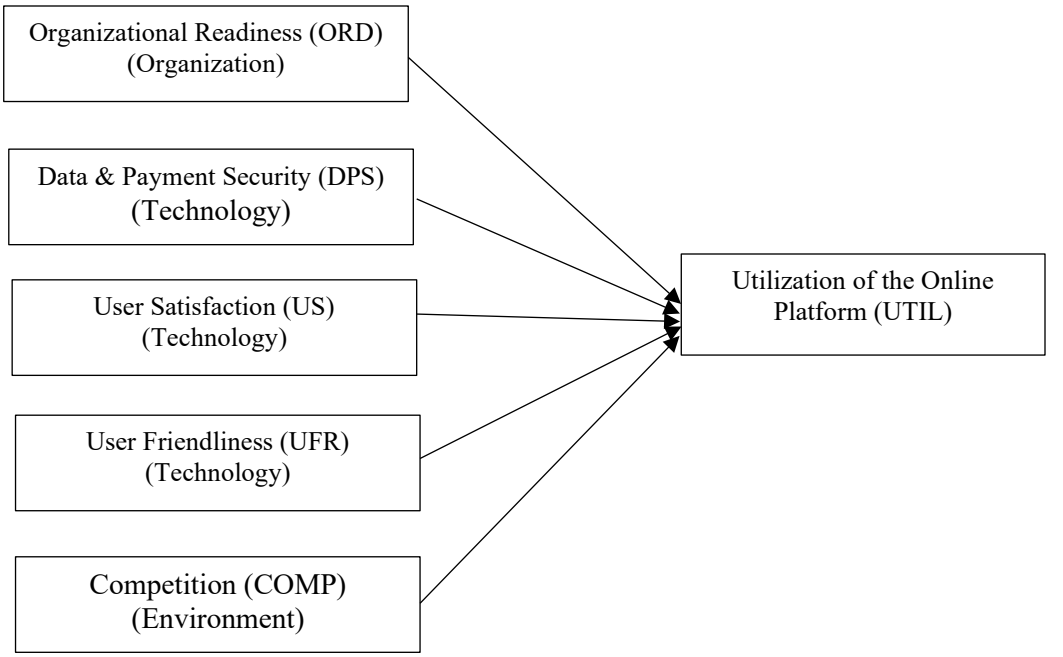

Figure 1 Proposed Model

HYPOTHESES

H1: Organizational readiness (ORD) has a positive influence on utilization of the online store.

H2: Data & payment security (DPS) have a positive influence on utilization of the online store.

H3: User satisfaction (USAT) has a positive influence on utilization of the online store.

H4: User friendliness (UFR) has a positive influence on utilization of the online store.

H5: Competition (COMP) has a positive influence on utilization of the online store.

Based on the studies by Gangwar, Date and Ramaswamy (2015), and Cruz-Jesus, Pinheiro and Oliveira (2019), it was hypothesized that these independent variables had a significant positive impact. However, the aims of this research sought not only to evaluate the direction and significance of the relationships, but also to evaluate the relative magnitude of the impact and to identify the factors that explained the greatest variance in the use of online shopping. The results are presented in the following section.

RESEARCH METHODOLOGY

A survey was carried out across the customers of M&P with a total of 651 responses being received. Overall, the study considered six research constructs, namely organizational readiness, data and

payment security, user satisfaction, user friendliness, competition, and online store utilization.

Multivariate normality and multi-collinearity tests were performed as key tests for these assumptions with the findings revealing no violations. The constructs were validated using confirmatory factor analysis before testing the hypotheses using structural equation modeling.

Data collected during research must be carefully checked to ensure that there are no responses which do not fit the normal distribution. Such an abnormality in the data is called skewness. The height and sharpness of the focal pinnacle is explored by Kurtosis, comparative with that of a standard bell curve. Qualities of asymmetry and kurtosis between - 2 and +2 are considered acceptable and demonstrate typical univariate appropriation. Master statistics bundles, such as SPSS report a standard error for both the skewness and kurtosis scores. This enables implementation of a straightforward dependable guideline. If dividing either score by its standard error returns a value of magnitude greater than ±1.96 implies that the data are not typical according to that measurement.

Multi-collinearity is the result of high correlations between research variables. This means, one can predict the result of one variable from the result of another. Multi-collinearity can be identified through the correlation coefficient of each pair of variables. An r value of +1 or -1 reflects perfect multi-collinearity.

Confirmatory Factor Analysis is commonly used for finding the correlations between variables. It is also used for identifying the existing latent constructs. Before testing the hypotheses, a researcher may also adopt empirical research and may use knowledge of the underlying theory.

The validity of the hypothetical model includes building the factors to be estimated. An instrument is recognized as having construct validity if factors are organized in such a way that each variable can be effectively estimated using the instrument. Construct validity testing of an instrument is occasionally carried out among students. However, it is regularly done to test the validity of the model's criteria.

A survey able to correlate with other instruments positively is said to have convergent validity. For producing convergent validity, bivariate correlation analyses may be adopted. If composite or subscale scores reflect significant correlation, then the presence of convergent validity is assumed to exist between the variables. A value of 0.3 for the convergent validity coefficient is considered acceptable.

A goodness of fit model is adopted for values based on prediction. It refers to the evaluation of the degree to which correlation exists between a group and the actual observations.

FINDINGS AND DISCUSSION

This section presents the key results that emerged from the analysis

of the survey data. The number of observations was 651. Results from the missing value analysis showed that the missing data was missing not at random (MNAR). Only one variable was affected; this related to the consumers' experience with the return policy. All the missing data were for consumers who had not returned anything. In this regard, since there were 207 missing entries out of 651 (31.8%) which was greater than the prescribed 20%, this variable item was dropped (Buuren, 2012; Raghunathan, 2015). Overall, the sample used had a sample power of 0.912 ($\lambda = 8.479$ [$F(2, 649) = 12.487$; $p<0.05$], greater than the prescribed minimum of 0.80, meaning that the sample size was more than the minimum required sample size (Wywial, 2015).

Overall, the study considered six research constructs, namely organizational readiness, data and payment security, user satisfaction, user friendliness, competition, and online store utilization. Being Likert-scale variables, the measures of central tendency and dispersion were computed using IBM SPSS Statistics v27 to summarize the distribution, skewness, and kurtosis. Outlier detection was carried out using the Mahalanobis distance (D). Since $D \sim \chi^2(6)$, the critical value for the six variables was $\chi^2(6) = 22.46$. The maximum distance that was observed from the data was $D^2 = 16.78 < 22.46$. Being within the critical range, this confirmed that the data did not have any outliers (Pallant, 2013; Howitt and Cramer; 2017). Multivariate normality and multi-collinearity tests were performed as key tests for these assumptions with the findings revealing no violations. The constructs were validated using confirmatory factor analysis before testing the hypotheses using structural equation modeling. Since the multivariate normality assumption was not violated, and the sample size was large, a covariance-based approach was used via the IB SPSS AMOS v27 software. The findings are detailed below.

Summary Statistics

The summary statistics for the six constructs considered in this study are presented in Table 1.

Table 1 Descriptive Statistics

	N	Mean	SD	Skewness	Kurtosis
Organizational Readiness	651	3.79	.669	-.147	-.499
Data and Payment Security	651	3.91	.642	-.299	-.582
User Satisfaction	651	3.66	.661	-.051	-.504
User Friendliness	651	4.07	.625	-.396	-.363
Competition	651	3.76	.655	-.063	-.629
Utilization of the Online Store	651	3.40	.668	-.019	.224

Having based the measurement of the items on a 5-point Likert scale than the mid-point, meaning that all were positively rated by the respondents. The highest rating related to user friendliness (μ_{UFR} = 4.07; σ = 0.625), followed by data and payment security (μ_{DPS} = 3.91; σ = 0.642). The third highest rating was for organizational readiness (μ_{ORD} = 3.79; σ = 0.669), with competition being the fourth rated (μ_{COMP} = 3.76; σ = 0.655). On the other hand, the least rated, albeit still positively, was the utilization of the online store (μ_{USE} = 3.40; σ = 0.668), while the second to least was user satisfaction (μ_{USAT} = 3.66; σ = 0.661). With respect to skewness, all statistics were negative, but within the 0 to -0.50 range, meaning that these six distributions were approximately symmetric, according to the work of Jaggia and Kelly (2013) and Grolemund and Wickham (2017). Lastly, for kurtosis, all statistics were within the ±1.96 limit. In this regard, it can be confirmed that any departure from normality was negligible.

Exploratory Factor Analysis (EFA)

The constructs measured in this study were indirectly measured using item scales and this necessitated the need to evaluate the scale dimensionality of the scales using factor analysis. The KMO test was computed as 0.844 which was greater than the recommended cut-off of 0.50, meaning that the study sample was adequate for EFA (Bandalos and Finney, 2010; Brown; 2015; Kilic, 2018). The Bartlett's test for sphericity was $\chi^2(153) = 7972.211$; $p < 0.05$, meaning that there was no identity matrix, thereby also validating EFA. EFA was carried out using Principal Axis Factoring (PAF) via the factor extraction method and the orthogonal varimax rotation (Brown, 2015). None of the communalities was less than the minimum prescribed value of 0.40 (Thompson, 2018), thus none of the items were dropped. The resultant variance explanation for each extracted factor is tabulated in Table 2.

Table 2 Factor Variance

Factor	Eigenvalues (λ)			Unrotated			Rotated		
	Σ(λ)	σ^2(%)	Σ (%)	Σ(λ)	σ^2 (%)	Σ (%)	Σ(λ)	σ^2 (%)	Σ (%)
1	5.885	32.695	32.695	5.636	31.313	31.313	2.319	12.882	12.882
2	3.331	18.504	51.199	3.079	17.108	48.421	2.269	12.605	25.487
3	1.845	10.251	61.450	1.599	8.884	57.305	2.260	12.557	38.044
4	1.574	8.745	70.195	1.325	7.363	64.669	2.242	12.458	50.502
5	1.152	6.399	76.594	.894	4.964	69.633	2.112	11.734	62.236
6	1.051	5.837	82.431	.779	4.326	73.958	2.110	11.722	73.958

Six factors were extracted using on the Guttman-Kaiser threshold of $\lambda \geq 1$ (Brown, 2015). The cumulative variance explained was 73.96% which was greater than the minimum recommended value of 60%, confirming the validity of the six extracted factors. The corresponding rotated factor matrix is presented in Table 3.

All the factors extracted maintained all the conceptualized items. This served as a confirmation that the research instrument used, measured what was intended to be measured. Cronbach's alpha was computed to determine construct reliability. According to Tabachnick and Fidell (2017), the minimum acceptable alpha statistic is 0.70. Comparing with this output, none of the alpha statistics were less than 0.70. In this regard, it can be confirmed that all constructs measured were reliable and that the research instrument used was internally consistent (Holmes, Illowsky and Dean, 2017).

Table 3 Rotated Factor Matrix

	Factor					
	COMP	ORD	DPS	UTIL	UFR	USAT
COMP1	**.895**	.045	.006	.102	-.004	.248
COMP2	**.880**	.012	.053	.081	-.007	.201
COMP3	**.731**	.049	.051	.055	.001	.194
ORD1	.041	**.861**	.095	.146	.227	.135
ORD3	.036	**.809**	.116	.115	.194	.169
ORD2	.047	**.756**	.103	.165	.199	.104
DPS2	.044	.104	**.882**	.161	.210	.031
DPS3	.026	.076	**.829**	.138	.216	.042
DPS1	.049	.115	**.711**	.128	.203	-.055
UTIL2	.117	.176	.164	**.884**	.153	.152
UTIL1	.067	.127	.117	**.777**	.156	.144
UTIL3	.078	.126	.168	**.761**	.103	.151
UFR3	.018	.231	.213	.114	**.808**	-.022
UFR2	-.009	.237	.308	.156	**.799**	.041
UFR1	-.027	.198	.209	.166	**.708**	.022
USAT1	.284	.163	.008	.192	-.002	**.823**
USAT2	.184	.101	.009	.136	.036	**.778**
USAT3	.243	.139	-.007	.121	.000	**.746**
Cronbach's α	.899	.897	.885	.891	.885	.876

Extraction: PAF; Rotation: Varimax

Confirmatory Factor Analysis (CFA)

Having extracted the factors using EFA, according to Brown (2015) and Thompson (2018), it was imperative to determine the construct validity of the extracted factors through the use of Confirmatory Factor Analysis (CFA). Nevertheless, there are two main approaches that could be used, namely the covariance-based approach or the variance-based approach, depending on whether the distribution is parametric or not (Kline, 2016). To establish the optimal approach, the two assumptions of multicollinearity and multivariate normality were tested. To test for multicollinearity, the condition index and the value inflated factor (VIF) were considered. The maximum tolerable threshold for the condition index is 30, while for VIF it is 5.0 (Garson, 2012; Grolemund and Wickham, 2017). Table 4 presents the multicollinearity results.

None of the condition indexes were greater than 30.0, and none of the VIF statistics were greater than 5.0, indicating that there was no multicollinearity among the independent variables. Regarding the multivariate normality, the multivariate skewness and kurtosis were measured providing the results tabulated in Table 5.

Mardia's coefficient of

Table 4 Test for Multicollinearity

	Eigenvalue	Condition Index	Tolerance	VIF
(Constant)	5.905	1.000		
Organizational Readiness	0.038	12.436	0.708	1.412
Data and Payment Security	0.022	16.278	0.751	1.332
User Satisfaction	0.015	20.162	0.722	1.384
User Friendliness	0.011	23.064	0.636	1.571
Competition	0.009	26.121	0.779	1.284

Table 5 Test for Multivariate Normality

Item	Skewness	Crit. Ratio (CR)	Kurtosis	Crit. Ratio (CR)
UFR3	-.249	-2.590	-.636	-2.314
UFR2	-.101	-1.049	-.314	-1.634
UFR1	-.322	-3.350	-.723	-2.765
USAT3	-.276	-2.875	-.496	-1.581
USAT2	.087	.910	-.498	-1.592
USAT1	.229	2.385	-.061	-.318
UTIL3	.014	.148	-.192	-1.002

Table 5 Test for Multivariate Normality (Continued)

Item	Skewness	Crit. Ratio (CR)	Kurtosis	Crit. Ratio (CR)
UTIL2	.078	.815	.552	1.876
UTIL1	.198	2.062	.140	.729
ORD3	-.083	-.863	-.351	-1.826
ORD2	-.099	-1.031	-.794	-3.138
ORD1	.070	.731	-.392	-1.043
DPS3	-.011	-.119	-.611	-2.184
DPS2	-.083	-.861	-.181	-.941
DPS1	-.374	-3.893	-.720	-2.747
COMP3	-.387	-4.031	-.633	-2.295
COMP2	.216	2.253	-.412	-1.148
COMP1	.186	1.933	-.272	-1.418
Multivariate			6.847	2.157

multivariate kurtosis was 6.847, with a Sine of less than 7.0 (Garson, 2012). The critical ratio (CR) was 2.15 < 3.0. These results confirm that the multivariate normality was within the acceptable threshold, implying that the multivariate normality assumption had not been violated. In this regard, the parametric covariance-based approach was adopted and implemented using IBM SPSS Amos in lieu of the variance-based partial least squares (PLS) approach. The resultant measurement model is illustrated in Figure 2 and its corresponding validity measures are tabulated in Table 6.

Composite reliability (CR) tested the internal consistency of the constructs, which ought to be greater than 0.70 according to Hancock and Mueller (2013). The results show that all constructs had CR > 0.70, with the minimum observed value being for user satisfaction (CR_{USAT} = 0.878). It follows that all constructs were reliable. With respect to the convergent validity measurement, AVE was computed. According to Byrne (2016) and Gana and Broc (2019), the minimum expected value was 0.60. From the outcome, all the constructs had AVEs greater than the minimum threshold, with the minimum being for user satisfaction (AVE_{USAT} = 0.708). In this regard, convergent validity was not violated. Lastly, to test for discriminant validity, the Heterotrait-Monotrait (HTMT) ratio of correlations was computed. According to Hair *et al.* (2017) and Wang and Wang (2019), the maximum tolerable HTMT ratio is 0.85. From the outcome of the study data, none of the coefficients between distinct constructs were greater than 0.85, with the highest being 0.534, between user satisfaction and

competition. Therefore, discriminant validity was not violated. Based on the foregoing CFA, as the composite reliability and construct validity were not violated, the constructs were deemed suitable for structural equation modeling (Byrne, 2016).

Structural Equation Modeling (SEM)

This study sought whether organizational readiness (ORD), data and payment security (DPS), user satisfaction (USAT), user friendliness

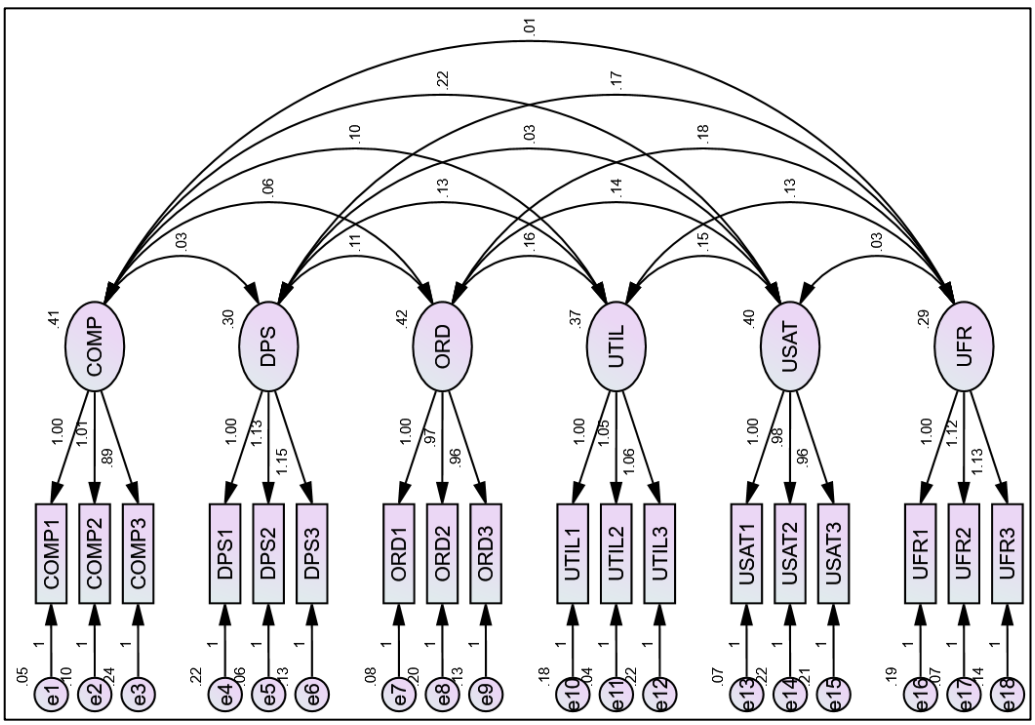

Figure 2 CFA Measurement Model

Table 6 Reliability and Validity

	CR	AVE	MSV	MaxR	COMP	DPS	ORD	UTIL	USAT	UFR
COMP	0.903	0.757	0.285	0.93	**0.870**					
DPS	0.890	0.731	0.311	0.913	0.097	**0.855**				
ORD	0.900	0.749	0.276	0.911	0.138	0.304	**0.866**			
UTIL	0.898	0.746	0.163	0.932	0.252	0.387	0.404	**0.864**		
USAT	0.878	0.708	0.285	0.902	0.534	0.092	0.347	0.394	**0.841**	
UFR	0.887	0.724	0.311	0.903	0.029	0.558	0.526	0.400	0.102	**0.850**

(UFR), and competition (COMP) had a significant positive influence on utilization of the online store (UTIL).

To test these hypotheses, since the constructs were measured by latent variables, structural equation modeling was carried out using IBM SPSS AMOs v27 as prescribed by Hoyle (2012) and Arbuckle (2016). The resultant model is illustrated in Figure 3 and its corresponding coefficients and hypothesis outcomes are tabulated in Table 7.

The results show that all the independent variables had a statistically significant positive influence on the utilization of the online platform. The greatest impact was made by user satisfaction (β_{USAT} = 0.291; $p<0.05$), followed by data and payment security (β_{DPS} = 0.240; $p<0.05$). The third highest impact was made by user friendliness (β_{UFR} = 0.198; $p<0.05$), followed by organizational readiness (β_{ORD} = 0.176; $p<0.05$), with the least being competition (β_{ORD} = 0.085; $p<0.05$). In this regard, the null hypotheses

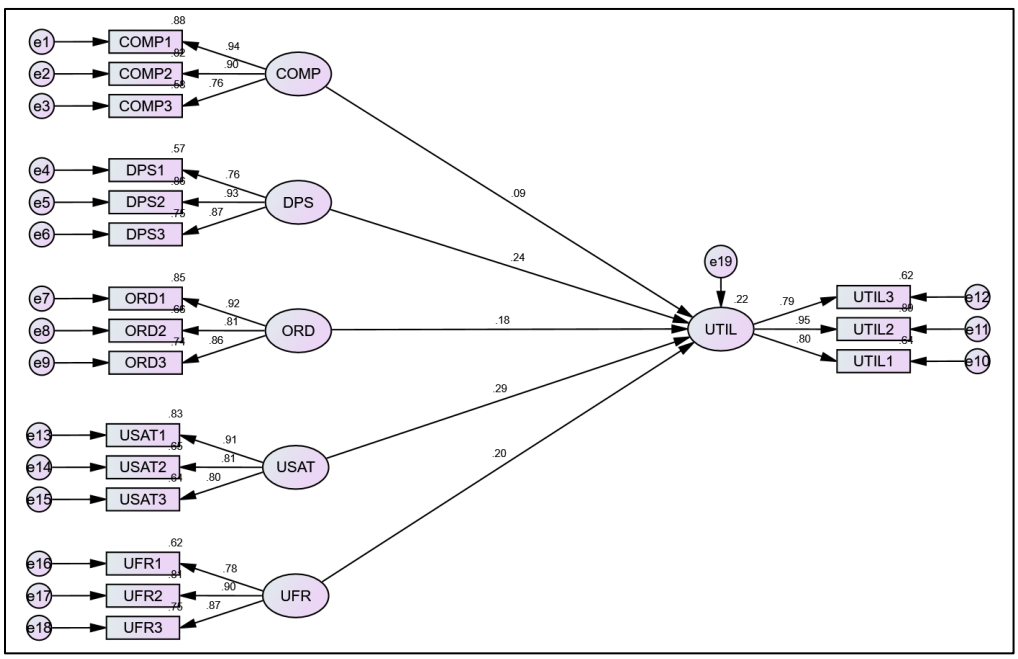

Figure 3 SEM Model

Table 7 SEM – Path Coefficients

			B	β	S.E.	C.R.	P
UTIL	<---	COMP	.075	.085	.034	2.216	.027
UTIL	<---	DPS	.245	.240	.041	5.981	.000
UTIL	<---	ORD	.152	.176	.034	4.488	.000
UTIL	<---	USAT	.262	.291	.037	7.158	.000
UTIL	<---	UFR	.203	.198	.041	4.957	.000

were rejected, and it can be argued based on this outcome that organizational readiness (ORD), data and payment security (DPS), user satisfaction (USAT), user friendliness (UFR), and competition (COMP), all had a significant positive influence on utilization of the online store (UTIL). The model fit results are presented in Table 8. Regarding the absolute fitness, $\chi^2(120) = 140.924$; $\chi^2/df = 1.174 < 3.0$; being less than 3.0, the goodness-of-fit was excellent (Ullman, 2013; Muthén and Muthén, 2017). For the relative fitness, CFI = 0.997 > 0.95, while for the model complexity parsimonious fitness, PCFI = 0.782 > 0.50; both measures show that there was excellent goodness-of-fit.

The RMSEA was 0.016 < 0.06, indicating that the fitness measure for the model was excellent (Hancock and Mueller; 2013; Schumacker and Lomax, 2016). Having met the prescribed fitness test it can be confirmed that the hypothesized model fit the data well, implying that the study's findings could be easily replicated.

CONCLUSIONS

Based on the foregoing discussion, it is concluded that organizational readiness (ORD), data and payment security (DPS), user satisfaction (USAT), user friendliness (UFR), and competition (COMP), all have a significant positive influence on utilization of the online store (UTIL). More importantly, it can be concluded that technological factors play the greatest role towards the utilization of online shopping. Among these technological factors the most significant role is played by user satisfaction, followed by data and payment security, with the third most significant factor being user friendliness. It is further concluded that while theoretical models such as TAM and DOI have been applied and widely accepted, these are not exhaustive measures of technology adoption and use. Rather, it is vital to also factor in contextual factors such as environmental factors and organizational factors, forming a matrix of factors. In other words, when modeling the adoption of innovations

Table 8 Model Goodness-of-Fit Tests

Measure	Estimate	Threshold	Interpretation
CMIN	140.924	--	--
DF	120	--	--
CMIN/DF	1.174	$1 \leq \chi^2/df \leq 3$	Excellent
CFI	0.997	>0.95	Excellent
PCFI	0.782	>0.50	Excellent
RMSEA	0.016	<0.06	Excellent
PClose	1.000	>0.05	Excellent

at an organizational level, as was the case in this study, it is imperative to adopt the Tornatzky and Fleischer (1990) TOE framework in lieu of the TAM, DOI, or UTAUT frameworks, as these tend to be focused more on technological dimensions rather than the environmental aspects, which were confirmed to have a statistically significant impact on the utilization of online shopping (Aljowaidi, Arbia and Arabia, 2015; Awa *et al.,* 2017; Hadi and Santoso, 2020). Lastly, while the technology constructs played the greatest role in determining online shopping use, extraneous factors such as COVID-19 evasion might have also played a role given that people chose to stay indoors and order online rather than physically visiting shops. Thus, it is highly imperative for future studies to factor in additional COVID-19 related factors.

ACKNOWLEDGMENT

This work was supported by the management of Muller & Phipps Pakistan (Pvt.) Limited, specifically Mr. Iftikhar Arif, General Manager for Information Technology. This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

REFERENCES

Acock, A. C. (2013). *Discovering structural equation modelling using Stata 13*. College Station, TX: Stata Press.

Aljowaidi, M. A., S.Arbia, and S.Arabia . (2015). *A Study of e-Commerce Adoption Using the TOE Framework in Saudi Retailers: Firm Motivations, Implementation and Benefits*. September, 253.

Arbuckle, J. L., (2016) *IBM SPSS Amos 24 User's Guide*. Armonk, NY: IBM.

Awa, H. O., *et al*. (2015). Integrating TAM, TPB and TOE frameworks and expanding their characteristic constructs for e-commerce adoption by SMEs. *Journal of Science and Technology Policy Management, 6*, 76-94.

Awa, H. O., Ojiabo, O. U., & Orokor, L. E. (2017). Integrated technology-organization-environment (TOE) taxonomies for technology adoption. *Journal of Enterprise Information Management*, 30(6), 893-921

Awa, H., *et al*. (2017). Revisiting technology-organization-environment (T-O-E) theory for enriched applicability. *The Bottom Line, 30*

Bandalos, D. L., & Finney, S. J. (2010). Factor analysis: Exploratory and confirmatory. In G. R. Hancock & R. O. Mueller (Eds.), *The reviewer's guide to quantitative methods in the social sciences* (pp. 93–114-). New York: Routledge

Bauerová, R., & Klepek, M. (2018). Technology Acceptance as a Determinant of Online Grocery

Shopping Adoption. Acta Universitatis Agriculturae et Silviculturae Mendelianae Brunensis66(3), 737-746.

Belhekar, V. M. (2016). *Statistics for Psychology Using R*. Thousand Oaks, CA: Sage.

Boomsma, A., Hoyle, R. H., & Panter, A. T. (2012). The structural equation modeling research report. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 341–358). New York: Guilford Press.

Brown, T. A. (2015). *Confirmatory Factor Analysis for Applied Research* (2nd ed.). New York: Guilford Publications.

Buuren, S. (2012). *Flexible Imputation of Missing Dat*a (Chapman & Hall/CRC Interdisciplinary Statistics). Chapman and Hall/CRC.

Byrne, B. M. (2016). *Structural equation modeling with AMOS: Basic concepts, applications, and programming* (3rd ed.). Mahwah, NJ: Erlbaum.

Chapman, C., & Feit, E. M. (2015). *R for marketing research and analytics*. New York, NY: Springer.

Chatterjee, S. (2015). Security and privacy issues in e-commerce: A proposed guidelines to mitigate the risk. *Proceedings of 2015 IEEE International Advance Computing Conference (IACC)* (pp. 393-396).

Chen, J. K. C., *et al*. (2013). Exploring e-readiness on e-commerce adoption of SMEs: Case study South-East Asia. *Proceedings of 2013 IEEE International Conference on Industrial Engineering and Engineering Management* (pp. 1382-1386).

Cruz-Jesus, F., Pinheiro, A., & Oliveira, T. (2019). Understanding CRM adoption stages: Empirical analysis building on the TOE framework. *Computers in Industry,* 109, 1-13

Darlington, R. B., & Hayes, A. F. (2017). *Regression Analysis and Linear Models: Concepts, Applications, and Implementation*. New York: The Guilford Press

Dugard P, Todman J and Staines H (2010) *Approaching multivariate analysis. A practical introduction*. Second Edition. Routledge: New York.

Field, A. P. (2018). *Discovering statistics using SPSS*. London, England: SAGE.

Finch, W. H., & Bolin, J. E. (2017). *Multilevel Modeling Using Mplus*. Boca Raton, FL: Taylor & Francis Group

Fox, J., Byrnes, J. E., Boker, S., & Neale, M. C. (2012). Structural equation modeling in R with the sem and OpenMx packages. In R. H. Hoyle (Ed.), *Handbook of structural equation modeling* (pp. 325–340). New York: Guilford Press.

Gana, K., Broc, G., (2019) *Structural Equation Modeling with lavaan*. London: Wiley

Gangwar, H., Date, H., and Ramaswamy, R. (2015). Understanding determinants of cloud computing adoption using an integrated TAM-TOE model.

J. Enterp. Inform. Manage. 28, 107–130

Gangwar, Hemlata & Date, Hema & Raoot, A.D. (2014). Review on IT adoption: Insights from recent technologies. Journal of Enterprise Information Management. 27. 488-502.

Garson, G. D. (2012). *Testing statistical assumptions*. Asheboro, NC: Statistical Associates Publishing.

Govindaraju, R., & Chandra, D. R. (2011). E-commerce adoption by Indonesian small, medium, and micro enterprises (SMMEs): Analysis of goals and barriers. *Proceedings of 2011 IEEE 3rd International Conference on Communication Software and Networks* (pp. 113-117)

Grolemund, G and Wickham, H (2017) *R for Data Science* O'Reilly Media: Gravenstein Highway North, Sebastopol, Canada.

Hadi Putra, P. O., & Santoso, H. B. (2020). Contextual factors and performance impact of e-business use in Indonesian small and medium enterprises (SMEs). *Heliyon*, *6*(3),

Hair, J. F., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Los Angeles, CA: Sage

Hancock, G. R., & Mueller, R. O. (Eds.). (2013). *Structural equation modeling: A second course* (2nd ed.). Charlotte, NC: Information Age Publishing, Inc

Heck, R. H., & Thomas, S. L. (2015). *An Introduction to Multilevel Modeling Techniques: MLM and SEM Approaches Using Mplus (3rd ed.)*. New York: Routledge.

Holmes, A., Illowsky, B., & Dean, S. (2017). *Introductory Business Statistics.* OpenStax. Rice University

Howitt, D., & Cramer, D. (2017). *Understanding statistics in psychology with SPSS*. Boston. Pearson Higher Education.

Hox, J. J. (2013). Multilevel Regression and Multilevel Structural Equation Modeling. In T. D. Little (Ed.), *The Oxford Handbook of Quantitative Methods* (pp. 281-294). New York: Oxford University Press

Hoyle, R. H. (Ed.). (2012). *Handbook of structural equation modeling*. New York: Guilford Press.

Jaggia, S. and Kelly, A. (2013) *Business Statistics, Communi-cating with Numbers*. McGraw-Hill, Irwin

Judd, C. M., McClelland, G. H., & Ryan, C. S. (2017). *Data Analysis: A Model Comparison Approach*. Routledge. New York

Kilic, A. (2018). Can Factor Scores be Used Instead of Total Score and Ability Estimation? *International Journal of Assessment Tools in Education*, 6(1), 25-35.

Kline, R. B., (2016) *Principles and Practice of Structural Equation Modeling (4th edition).* New York/London: Guilford.

Loehlin, J. C., & Beaujean, A. A. (2017). *Latent Variable Models: An Introduction to Factor, Path,*

and Structural Equation Analysis. New York, NY: Taylor & Francis.

Marangunić, N., & Granić, A. (2015). Technology acceptance model: A literature review from 1986 to 2013. *Universal Access in the Information Society, 14*, 81-95

Mohtaramzadeh, M., T.Ramayah, and C.Jun-Hwa . (2018). B2B E-Commerce Adoption in Iranian Manufacturing Companies: Analyzing the Moderating Role of Organizational Culture. *International Journal of Human-Computer Interaction* 34 (7): 621–639.

Morteza, G., & Sai, H. T. (2013). The role of owner/manager in adoption of electronic commerce in small businesses: The case of developing countries. *Journal of Small Business and Enterprise Development, 20*, 754-787.

Muthén, L. K., & Muthén, B. O. (2017). *Mplus user's guide* (8th ed.). Los Angeles, CA: Muthén & Muthén

Pallant, J. (2013). *SPSS Survival Manual. A step by step guide to data analysis using SPSS*, 4th edition. Allen & Unwin,

Pappas, G., I. O.Kourouthanassis, P. E.Giannakos, and M. N.Lekakos .(2017). The Interplay of Online Shopping Motivations and Experiential Factors on Personalized e-Commerce: A Complexity Theory Approach. *Telematics and Informatics* 34 (5): 730–742.

Raghunathan, T. (2015). *Missing data analysis in practice*. CRC Press, Boca Raton, FL

Rodríguez-Ardura I., Meseguer-Artola A. (2010). Toward a longitudinal model of e-commerce: environmental, technological, and organizational drivers of B2C adoption. *Inform. Soc.* 26 209–227

Rogers E. M. (1995). *Diffusion of Innovations*, 2nd ed. New York, NY: Free Press

Roy, T.K., R. Acharya and A. Roy. (2016). *Statistical survey design and evaluating impact*. Cambridge University Press, Delhi.

Schumacker, R. E., & Lomax, R. G. (2016). *A Beginner's Guide to Structural Equation Modeling (4th ed.)*. New York: Routledge

Scupola, A. (2009). SMEs' e-commerce Adoption: Perspectives from Denmark and Australia. *Journal of Enterprise Information Management* 22 (1/2): 152–166.

Sweet, SA and Grace-Martin, K (2012) *Data Analysis with SPSS: A First Course in Applied Statistics*. Fourth Edition. Pearson: London

Tabachnick, B. G. & Fidell, L. S. (2017). *Using multivariate statistics*: Chicago: University of Chicago Press.

Thompson, B. (2018). E*xploratory and confirmatory factor analysis: Understanding concepts and applications*. Washington, DC: American Psychological Association.

Tornatzky G. & Fleischer M. (1990). *The Process of Technology Innovation*, Lexington, MA, Lexington book

Tripopsakul, S. (2018). Social media adoption as a business platform: an integrated TAM-TOE framework. *Polish Journal of Management Studies* 18(2), 350-362.

Turban, J., J. K.Lee, D.King, T. P.Liang, and D.Turban . (2010). *Electronic Commerce* Bergen: Prentice Hall Press.

Ullman, J. (2013). Structural equation modeling. In B. G. Tabachnick & L. S. Fidell (Eds.), *Using multivariate statistics* (6th ed.). New York: Pearson.

Venkatesh, V., & Davis, F. D. (2000). A theoretical extension of the technology acceptance model: Four longitudinal field studies. *Management Science, 46*, 186-204

Venkatesh, V., Morris, M., Davis, G., & Davis, F. (2003). User acceptance of information technology: Towards a unified view. *MIS Quarterly,* 27(3), 425-478.

Wang J. Wang X. (2019) *Structural Equation Modeling: Applications Using Mplus*. Chichester, West Sussex. John Wiley.

Wywial, J.L. (2015). *Sampling designs dependent on sample parameters of auxiliary variables*. Springer, New York

Yu, T.-K., M.-L.Lin, and Y.-K.Liao . (2017). Understanding Factors Influencing Information Communication Technology Adoption Behavior: The Moderators of Information Literacy and Digital Skills. *Computers in Human Behavior* 71: 196–208.