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The Influence Of Technological Factors On E-Business Diffusion In The Small-To-Medium Enterprise Sector In Zimbabwe

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Abstract –This article is a derivation from the researcher's PhD thesis on e-business diffusion in the small-to-medium enterprise (SME) sector in Zimbabwe. The research examines the influence of technological dimensions, namely, relative advantage, compatibility, complexity, trialability and observability on e-business diffusion. A survey design, using a questionnaire based on Likert's five point scale to collect data through online survey monkey, was adopted. A sample of 590 owners and managers of small-to-medium firms was obtained through probability random sampling. The research engaged a quantitative research design and used exploratory and confirmatory factor analyses to ascertain the dimensionality of factors adopted for the study and construct validity, respectively. Structural equation modelling (SEM) was engaged using AMOS SPSS v26 to determine which factors have a significant impact on e-business diffusion. The study concluded that only three out of the five technological dimensions have a significant influence on e-business diffusion in the Zimbabwean SME sector. Central government is urged to focus on establishing a fully equipped national ICT infrastructure and requisite training programmes to facilitate the diffusion of e-business in the fledgling small enterprises. SMEs in Zimbabwe are advised to adopt e-business operating systems as a survival and sustainability imperative in the current technology-driven global business environment necessitated by the prevailing COVID-19 pandemic.

Keywords – Technological Dimensions, Smes, E-Business, Zimbabwe.

I. Introduction And Background To The Study.

The small-to-medium enterprise (SME) sector is recognised as the engine of economic growth and development in world economies. Similarly, it has assumed greater importance today than ever before in the Zimbabwean business arena. In 2015, small-to-medium enterprises were estimated to be contributing 40% of the country's gross domestic product, while employing approximately 5.7 million people out of a population of 13.81 million. Zimbabwe's economic development is thus intrinsically linked to the development of the SME sector. This was driven by an increase in labour supply arising from retrenchments associated with the impact of the economic structural adjustment programme (ESAP) that Zimbabwe was compelled to adopt in 1991. The programme was intended to create a market-oriented, export-based and self-sustaining productive sector, in line with the developmental agenda of the World Bank and International Monetary Fund. This triggered unemployment which came to a head in 2015 with the promulgation of the Labour Amendment Act (2015). The Act gave employers more leverage to retrench workers with minimum retrenchment benefits, in accordance with the economic standing of the organisation. This was the genesis of an informal business sector created by the former employees in their respective areas of expertise in order to earn a living. The sector eventually became a vibrant business community which caught the attention of government and led to its classification as the small

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and medium enterprise sector. However, it was fraught with a number of constraints due to the informality of operations, lack of business training and financial backing. While government, financial and other related institutions tried to address these limitations, the SME sector still reels under the challenges. The Central Bank of Zimbabwe recorded only about 4% of the total loan disbursements to the SME sector in 2017, yet it employs at least 78% of the total workforce of the country [1].

The 21st century business environment requires a robust SME sector to drive the economic growth of the country. Electronic business (e-business) has become central in global business transactions as a competitive tool and a model for growth and development. This has been accelerated by the COVID-19 pandemic which has imposed limitations to the traditional brick-and-mortar business operations prevalent in the developing nations. E-business is considered as the general conduct of business activities using electronic channels on the internet. It represents a new evolution of trading, offering a borderless global market space. It creates innovative virtual businesses and trading communities across regions and international boundaries, thus making transactions less cumbersome and more convenient for distant trading partners. It is considered as the overarching internet-anchored strategy of restructuring old business models to maximise trading communities' market reach, value and profits ([2], [3]). The repeatedly chronicled benefits of e-business and provision of readily available solutions have projected it as the desired path of business operations in the 21st century ([4], [5, 2], [6], [7]). However, despite the benefits and convenience touted by several researchers and international bodies, the developing world has been lagging behind in electronic technology adoption in their business activities ([8], [9], [10], [11], [12], [13], [14], [15], [16]). Zimbabwe features among the countries whose pace of e-business diffusion is slow ([8], [11], [17]). This propelled the researcher to examine how Rogers' [18] technological factors in his Diffusion of Innovation (DOI) model influence e-business adoption among small-to-medium enterprises operating in the Zimbabwean market environment.

II. Focus Of The Study

Diffusion in this study refers to the gradual process of accepting and adopting e-business as an operational business model. The concept is based on the influence of the technology dimensions as posited in Rogers' [18] Diffusion of Innovation (DOI) model. The model's applicability is tested on the small-to-medium enterprises (SMEs) in the Zimbabwean market environment, where diffusion still lags behind, to enable the technology suppliers to understand and provide what is important to the prospective users.

III. Literature Review And Hypothesis Derivation

Rogers' [18] Diffusion of Innovation theory posits that there are five attributes or dimensions which are the most influential for any innovation diffusion process to take place in an organisation. These are: relative advantage, compatibility, complexity, trialability or risk loading and observability (also referred to as communicability). This investigation raises the main hypothesis of the research.

H0: Technological factors have a significant influence on the diffusion of e-business in the Zimbabwean small-to-medium enterprise sector.

The hypothesis is operationalised by five sub-hypotheses linked to each of the five technological dimensions in the DOI model.

3.1 Relative advantage

Relative advantage is depicted as the extent to which the adoption of a new technology or innovation is perceived to add value to the current operating system or improve product or service quality ([18], [19], [20]). Value-addition is an important aspect considered in technology adoption. This may be benefits derived from the use of the new technology in terms of economic, social and cost improvements, among other things. Value added to the organisation may also be seen in better performance and higher economic gains as compared to what other technologies offer ([18], [9], [14], [21]). The greater the perceived benefits by the organisation, the greater the potential for adoption. Relative advantage has been consistently regarded as one of the best drivers in adopting an innovation by a plethora of researchers ([22], [13]). This leads to the first study sub-hypothesis:

H1: Relative advantage has a positive significant influence on e-business diffusion in the SME sector in Zimbabwe.

3.2 Compatibility

Rogers ([23], [18]) views compatibility as the extent to which an innovation or new technology blends in with the firm's current systems or products and services. This enhances the existing system, resulting in minimal changes and related costs. Where the attributes of the new technology do not seem to flow smoothly with current processes, they could be viewed negatively because of

the additional time needed to learn and adjust to it in line with the existing system ([18], [24], [14], [20]). Several researchers posit that enterprises generally tend to adopt technology which is consistent with their internal values, the knowledge that the company already possesses and accumulates over time, culture, working processes, infrastructure and strategic thrust ([25], [26], [21], [27], [13], [20]). Resistance to adoption arises from perceived incompatibility of the technology with the thrust of the organisation [28]. This results from the burden envisaged in effecting the necessary changes and finding resources required to align the organisation's current systems to the new technology. Compatibility has been consistently found to be statistically significant as a determinant of e-commerce or e-business diffusion ([18], [14], [8], [29], [20]). This gives rise to the second sub-hypothesis:

H2: Compatibility has a positive significant influence on e-business diffusion in the SME sector in Zimbabwe.

3. 3 Complexity

Rogers casts complexity as the degree to which a technical innovation is perceived to be relatively difficult to understand and use ([23], [18], [30], [31], [22], [13]). This is described as 'perceived ease of use' [32]. It is also explained as the time firms are likely to take to understand the intricacies of the new technology, its application and the benefits that can be harvested through its proper utilisation in their individual businesses [33]. Similarly, complexity is classified as perceived risk related to the degree of difficulty in understanding and using an innovation [22]. The easier it is to understand the innovation, the faster the adoption process and vice versa. Complexity is consistently hypothesised to be negatively correlated to innovation adoption ([34], [30], [22], [29], [4], [20]). It is generally accepted that complexity, whether perceived or real, plays a critical role in the suppression of e-business adoption by both small and medium enterprises ([23], [18], [35], [30], [31], [22], [13]). These arguments lead to the third sub-hypothesis of the study:

H3: Complexity has a significant negative influence on e-business diffusion in the SME sector in Zimbabwe.

3.4 Trialability/Risk loading

Trialability is the fourth technological dimension given by Rogers and subsequent researchers as influencing the diffusion of new technologies. It is the opportunity given to an individual or organisation to test or try out the new technology, innovation or new idea, before actually adopting it for use ([18], [30]). It is a way of testing the efficacy or compatibility of a particular application or idea to the firm's own operating system or strategic pathway. Rogers (18) explains it as the way an innovation can be experimented with on a limited basis prior to adoption. Innovation is associated with possible security risks to information moving through various stages of electronic communication channels and the likelihood of being intercepted and used in a way which can be harmful to the organisation ([36], [37]). The issue of security and risk, either real or perceived, has been shown as a factor affecting the prospective user's inclination towards adoption and the actual adoption of an innovation or new technology, hence the importance of trialability ([8], [39], [40], [13]). Trialability allows for any adjustments to be made to suit the needs of the adopter before they purchase the application for their use. This helps to dispel any security apprehensions the customer may harbour. It thus creates a relationship of partnership and trust between the supplier and the customer as the prospective buyer contributes to the process of adjusting the innovation to their requirements. This is one way prospective adopters of the technology or innovation try to avert any major risks that may arise from adopting a new innovation without prior trial. Trialability helps raise prospective adopters' confidence levels in terms of the safety, trust and efficacy of the application. While this dimension is omitted in several studies discussing Rogers' technological dimensions, trialability is a critical consideration, especially in developing countries where, as stated before, there has been sluggish adoption in small-to-medium businesses ([17], [9], [10], [11], [12], [13], [14], [15], [16]). It is also important in dissipating entrepreneurs' obsession with the risk implications perceived to be inherent in new ideas and innovations, especially in collectivist cultures that define most developing countries like Zimbabwe. This gives rise to the fourth sub-hypothesis:

H4: Trialability has a positive significant influence on e-business diffusion in the SME sector in Zimbabwe.

3.5 Observability/Communicability

Observability is also referred to as communicability in the sense that it communicates observable benefits or value derived from using an innovation. Rogers (18) defines observability as "the degree to which the results of an innovation are visible to others" ([35], [20], [30]). It is posited that the easier it is for others to witness positive results of an innovation from current users, the more likely they are to adopt it. Observable results manifest in different forms like, improved quality of services or products, notable improvement in production, distinctive features of the system and so forth. Observability can also be achieved through the method

used to explicate the innovation and how convincingly the benefits are articulated. Visible positive results are more likely to stimulate peers' inclination towards trial of the application and also lowers the degree of uncertainty [41]. Observability is positively correlated with diffusion in the same way as relative advantage, compatibility and trialability ([19], [31], [13], [23]). This raises the fifth sub-hypothesis:

H5: Observability has a significant influence on e-business diffusion in the SME sector in Zimbabwe.

These five sub-hypotheses build towards the primary hypothesis (**H0**)

From the above literature review and the resultant sub-hypotheses, the researcher derived the following conceptual framework which encapsulates the main hypothesis of the study as stated above. This is presented in **Figure 1** below.

Conceptual framework for the study

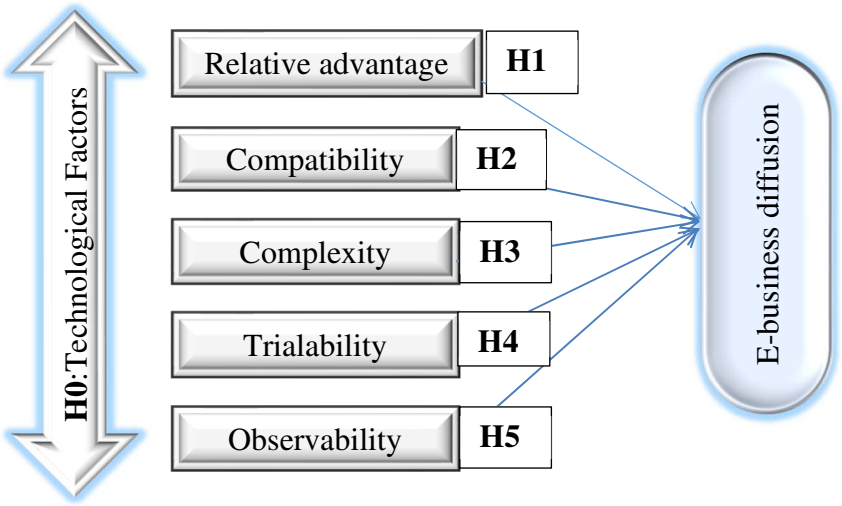

Figure 1: Researcher's Conceptual Framework (2021)

IV. Research Methodology

4.1 Research Design, Target Population and Sampling

This research was carried out in Harare Metropolitan area, the capital city of Zimbabwe. Harare is the hub of SME activity and, as such, the results and recommendations can be reasonably generalised to the rest of the SMEs in the country. The study engaged the quantitative design, anchored on the positivist philosophy. This was necessitated by the need for a large sample which allows for generalisation of results [42]. The quantitative design also provides the data in numerical form. This simplifies analysis and enhances the explanation or understanding of the research problem through statistical models [43]. The target population was taken as indeterminate due to gaps in the official registration records. The study population were companies registered with the Zimbabwe Revenue Authority (ZIMRA) in the Harare Metropolitan Area. The owners and managers were selected as the respondents by virtue of their key positions in the strategic drive of the firms and as the information repositories. The study adopted the probability sampling method to give each firm a fair chance of selection and to aid in generalisability of results.

4.2 Data Collection

Data was collected electronically using questionnaires through survey monkey. The questionnaire was based on a five-point Likert scale of 1=strongly disagree; 2=agree; 3=not sure; 4=agree and 5=strongly agree. Closed-ended questions were used to simplify the statistical analysis process of data. Seven hundred questionnaires (700) were dispatched to respondent firms, with 603 returned (86.14%). Out of these, 590 (84.09%) were fully completed and included in the final analysis of data. This was an excellent rate of return which can be attributed to the interest and importance attached to the subject of research by the respondents.

4.3 Results and Analysis

IBM Statistical analysis package SPSS v26 was used to capture and clean the data for errors, missing items and possible outliers. This was followed by testing the scales used in the instrument for validity and reliability through exploratory factor analysis (EFA) [44] to ensure they were in line with the current study. Two key assumptions recommended to measure the sampling adequacy prior to the engagement of exploratory factor analysis were tested. The first one, Kaiser-Meyer-Olkin (KMO) measure of central tendency fell within the stipulated threshold of >0.700 at 0.918>0.700 [45]. This was very high compared to the minimum acceptable threshold of >0.5 given by Malhotra and Dash [43] or the generally acceptable threshold of >0.6 ([46], [47]). The second test, Bartlett's test of sphericity, also met the required thresholds, with χ^2= 6698.121, Df=(276), p000<0.05 [48], hence the adoption of exploratory factor analysis was justified. The principal component analysis (CPA) was engaged as the extraction method ([49], [50]) using varimax orthogonal rotation with Kaiser normalization to ensure a more reliable factor structure free from cross-loadings [51]. The result **(Table 1)** showed that all the items in the five dimensions, except one under 'trialability' (**TR1**), fell within the acceptable communality at above 0.400 ([52], [53], [51]). However, it was noted that the items that had been originally listed under the variable 'observability' (**OBS2**, **OBS3** and **OBS4**), were loaded under 'relative advantage', except one (**OBS1**). Only one loaded under 'observability' below the stipulated threshold. This result seemed to indicate a spurious loading which could be attributed to the similarities in the measurement scales of 'relative advantage' and 'observability' relating to the benefits of technology diffusion. For that reason, 'observability' was found redundant, hence it was dropped. This resulted in four components being extracted from the original five, with a cumulative total variance explained of 59.153%. The first component (**RA**) (8.814) explained 19.582% of the variance, while the second (**CO**) (2.407) explained 16.226% of the variance and the third (**CP**) (1.617) explained 13.628% of the variance and lastly, the fourth (**TR**) (1.359) explained 9.717% of the variance. As the total variance of the four components was higher than the acceptable prescribed minimum threshold of 50% [53], they were found to be representative of the greater portion of the technological construct (**Table 1**).

Having established the four factors for the technological construct, Cronbach's alpha was calculated to ascertain their internal consistency and reliability of scale. All the items successfully loaded in each of the four dimensions, indicating an alpha value above the recommended minimum threshold of 0.7 [54]. Relative advantage loaded at 0.875, compatibility at 0.778, complexity at 0.850 and trialability at 0.724. The result confirmed reliability of all the items for each factor and thus determining the internal consistency of the dimensions adopted for the study.

Table 1: Validation of Measurement Scales

Technological Dimensions – EFA	Item loading	KMO Bartlett's	Rotated component matrix			
		0.918 0.000	Component 1	Component 2	Component 3	Component 4
Relative Advantage (RA)						
Use of e-business improves customer service (**RA1**)	.565		**.744**			
Use of e-business improves quality of work (**RA2**)	.669		**.739**			
Use of e-business increases productivity (**RA3**)	.684		**.692**			
Use of e-business improves competitiveness (**RA4**)	.665		**.732**			
Use of e-business reduces costs (**RA5**)	.501		**.611**			
Compatibility (CO)						

Use of e-business is in line with the organization's operating systems. (**CO1**)	.586		**.707**		
Use of e-business is compatible with our customers' expectations. (**CO2**)	.699		**.691**		
Use of e-business is in line with the nature of our business. (**CO3**)	.669		**.681**		
Employees' skills make it easy to adopt e-business (**CO4**)	.536		**.598**		
Use of e-business is generally adopted in our business sector (**CO5**)	.454		**.674**		
Complexity (CP)					
Learning to use e-business is easy. (**CP1**)	.535			**.699**	
Adopting e-business systems is simple for my business. (**CP2**)	.690			**.758**	
Using e-business in my organization is not complicated. (**CP3**)	.642			**.745**	
My organization can easily install e-business systems. (**CP4**)	.661			**.747**	
Training employees to use e-business is easy. (**CP5**)	.562			**.724**	
Trialability (TR)					
I have tried several e-business systems (**TR1**)	.443				.473
I can get e-business systems/applications on trial for some time (**TR2**)	.695				**.802**
I can experiment with any new e-business application to test compatibility (**TR3**)	.688				**.790**
It is possible to try out an e-business application without committing to it. (**TR4**)	.565				**.734**
Use of e-business is safe.	.359				
Observability (OB) (OBS)					
The benefits of using e-business can be easily seen generally (**OBS1**)	.500	.485	.492	.130	.075
The use of e-business can be easily seen in the quality of service (**OBS2**)	.601	**.629**			

The use of e-business is shown by improved customer relationships (**OBS3**)	.651	**.697**			
The use of e-business can be seen in the product quality (**OBS4**)	.576	**.656**			
Eigen value		8.814	2.407	1.617	1.359
Variance explained		36.723%	10.028%	6.739%	5.663%
Accumulated variance explained		36.723%	46.751%	53.490%	59.153%
Cronbach's alpha for each dimension		0.875	0.778	0.850	0.728

IBM SPSS AMOS v26 was used primarily for structural equation modelling (SEM) to help model the research outcome into actionable models [55]. Structural equation modelling is considered to be the most robust and accurate statistical package for multivariate relationships ([56], [57], [58], [59]). Consequently, the researcher adopted SEM as the optimal modelling technique that best addressed the latent variable interactions, as well as multilevel regression analysis using both unstandardized and standardised path coefficients.

Firstly, confirmatory factor analysis was carried out to determine construct validity for the application by testing for convergent and discriminant validity ([60], [61]). For convergent validity, all the items had valid standardised regression coefficients greater than the threshold of 0.4 and p0.000< 0.05[45], [62]). For discriminant validity, none of the covariances was higher than the maximum threshold 0.85 ([45], [62]). The highest correlation coefficient was 0.713 between relative advantage (RA) and complexity (CP), thus confirming discriminant validity. All the dimensions were confirmed to be independent and structurally valid ([62], [63]). The results confirmed both convergent and discriminant validity of the construct.

Secondly, model fit tests were carried out to confirm these results for structural equation modelling. The absolute fit index, CMIN/DF, measuring model validity should be less than 3.0 ([62], [53]). For the relative fit indices, the comparative fit index, CFI and IFI should be greater than 0.90 [60] and the Root Mean Square Error (RMSEA) for the model parsimony ought to be less than 0.07 [62] or 0.80 ([63], [45]). The results in **Table 2** show that none of these goodness-of-fit prescriptions were violated. This certified the accuracy and validity of the study's structural model.

Table 2: Model Fit Results

Goodness of Fit Index	**Threshold(s) and author(s) supporting**	**Finding(s)**
CMIN/DF	<3.0 ([62], [53])	2.021<3.0
CFI	>0.90 [60]	0.910>0.90
RMSEA	<0.7 [62] ; <0.8 ([63], [45])	0.042<0.8

After validating the goodness of fit indices for confirmatory factor analysis results, multivariate normality test was done to determine whether the data distribution fell within the parametric or non-parametric distribution pattern[60]. The results of the analysis validated the normality assumptions and supported the adoption of parametric covariance-based structural equation modelling (CB-SEM). The CB-SEM was appropriate for the large sample size of the study (590 fully completed responses). The other type of SEM, the variance-based structural equation modelling (VB-SEM), also known as the 'partial least squares' structural equation modelling (PLS-SEM), was not appropriate for the study as it is considered more robust for sample sizes less than 200 ([60], [64]). The results of the SEM (**Table 3)** show that out of the four dimensions that had been extracted through the principal component analysis (PCA), 'relative advantage' had no significant influence on e-business diffusion, with p0.462>0.05 and hence it was dropped from the final model. 'Compatibility' **(CO)** had the highest standardised coefficient (0.152) and the highest critical

ratio (3.646>1.96) and p=***<.05. Trialability **(TR)** was the second highest, with a coefficient of 0.130 and critical ratio of 2.942>1.96, p=0.003<0.05. Complexity came third, with a path coefficient of 0.129, critical ratio 3.023 and p0.003<0.05.

Table 3: SEM – Standardised Regression Weights for Technological Dimensions

		Estimate	Standardised	S.E.	C.R.	P
DIFF	<--- RA	-.012	-.030	.016	-.736	.462
DIFF	<--- CP	.047	.129	.016	3.023	.003
DIFF	<--- TR	.052	.130	.018	2.942	.003
DIFF	<--- CO	.062	.152	.017	3.646	***

Having established the relationships between the independent variables and the dependent variable – **diffusion** – it was important to confirm the validity of the model derived from the structural equation modelling. This was achieved through model fit tests, namely, absolute fit indices, relative fit indices, parsimonious fit indices and non-centrality-based fit indices in accordance with other researchers ([65], [66], [56], [53]). The absolute fit index, CMIN/DF test fell within the threshold of <3.0 [53], registering 2.113< 0.3 but the p-value registered p0.000<0.05, which is higher than the stipulated threshold of p>0.05. However, this was disregarded because the p-value of the CMIN/DF test can be affected by a large sample size [67], [68]), which was the case in this study. This was compensated for by other model fit tests which were used in combination with the CMIN/DF test to override this sensitivity. **Table 4** shows the model fit test results.

Table 4: Model Fit Results for Final Model

Goodness of Fit Index	**Threshold(s) and author(s) supporting**	**Finding(s)**
CMIN/DF	<3.0 [53]; (p >0.05)	2.113 < 3.0; (p0.000<0.5)
CFI	>0.90 [60]	0.919
PNFI;PCFI	>0.5 [60]	0.644; 0.684
RMSEA	<0.7([62], [67]; and <0.8 ([63], [45])	0.062

The CFI was within the stipulated threshold of >0.90 at 0.919>0.90 [60] thus confirming the research model. The PNFI and PCFI were 0.644>0.5 and 0.684>0.5 respectively, both meeting the postulated threshold of greater than 0.05, hence confirming that the model parsimony was good. The findings also showed that the RMSEA statistic was 0.062<0.70, which was below the upper limit given ([67], [62]) or <0.80 ([63], [45]). With all the model fit tests falling within the stated levels, the model was shown to be of good fit.

4.4 Discussion and Hypotheses confirmation

The foregoing analysis of results showed some points of convergence and departure from extant literature with respect to the influence of the five technological dimensions on e-business diffusion.

4.4.1 Observability and Relative Advantage

'Observability' was eliminated during the rotated component matrix factor extraction. Its measurement items were grouped together with 'relative advantage' (**Table 1**). This was an indication that there was no differentiation between the two variables in the responses. The respondents may have considered the items under 'relative advantage' and 'observability' to point to the same benefits derived in the diffusion of e-business. 'Observability' was thus made redundant and dropped. This was in contrast to extant literature where it has been postulated as a standalone dimension with a significant influence on e-business diffusion ([25],

[18], [38], [69], [70], [19], [71], [72]). Furthermore, '**relative advantage**' was not significant in influencing e-business diffusion, according to the results of the structural equation modelling (p0.462>0.05) (**Table 3**). This is a further contrast to a plethora of researchers who found it to be a highly significant driver in the diffusion of innovation, technology, e-commerce and/or e-business ([23], [18], [19], [70], [71], [31], [22], [20]). This insinuates that, in the Zimbabwean market, this factor is not considered very important, either because the respondents are not conversant with the benefits inherent in technology adoption or have little understanding of e-business. This seems to affirm the point made some researchers ([8], [11], [17]) that Zimbabwe still lags behind in technology adoption. On the basis of these findings,

Hypothesis **H1**: Relative advantage has a significant influence on e-business diffusion in the SME sector in Zimbabwe is rejected

Hypothesis **H5**: Observability has a significant influence on e-business diffusion in the SME sector in Zimbabwe is rejected.

4.4.2 Compatibility

Compatibility was statistically significant, registering a p ***<0.05. It registered the highest p-value among the four dimensions that resulted from the principal component analysis and subsequent structural equation modelling analysis. This corroborates other studies which found compatibility to be a significant driver of technology, e-business and/or e-commerce adoption in SMEs ([33], [22], [20]). This result points to the general tendency of firms to adopt technologies that align with their internal experiences and values, thus requiring minimal changes in the company's value system and, or internal infrastructure. Therefore:

H2: Compatibility has a significant influence on e-business diffusion in the SME sector in Zimbabwe is accepted.

4.4.3 Complexity

Complexity is postulated as the difficulty to understand technology if it is new in the organisation. It may also relate to the amount of time taken to learn or align the innovation to the existing systems or knowledge base, among other reasons. The dimension recorded a statistically significant p-value of p0.003<0.05. This supports earlier researches which found complexity to be negatively correlated to diffusion ([25], [30], [22], [29], [14], [20]). The result in this research likely explains the sluggish level of e-business diffusion in the small-to-medium-enterprise sector in Zimbabwe. The general lack of resources for SMEs to upgrade their systems and train personnel in the requisite ICT skills are contributory factors to perceived complexity in adopting available technology. Therefore:

H3: Complexity has a significant negative influence on e-business diffusion in the SME sector in Zimbabwe is accepted.

4.4.4 Trialability

Trialability is the opportunity to sample the new technology, innovation or new idea, to test its efficacy or compatibility to the firm's own operating system, resources or strategic thrust, before actually adopting it for use ([18], [30]). The opportunity to try out the technology before ultimately purchasing and using it helps raise prospective adopters' confidence levels in terms of its safety, dependability and efficacy, hence trialability is posited as positively correlated to diffusion [18]. There is a paucity of discussion of this dimension in a lot of literary works focussing on Rogers' DOI theory. Most researchers dwell mostly on three of the factors of the model, namely, relative advantage, compatibility and complexity, to the exclusion of trialability and observability. The result in this study registers trialability to be statistically significant, with p0.003<0.005. This corroborates the available research findings in the literary domain ([18], [38], [36], [37]). The finding in this study is an indication of how much this factor is considered critical by the Zimbabwean SME sector, given their limited resources and in some cases, lack of experience or expertise in the area of e-business. Trialability would help to build confidence and trust between the supplier and the SME, which is likely to facilitate the adoption process. This points to the need for suppliers or vendors of technology products to factor in a simple mechanism of getting the small firms to try out the technology as a token of good will and trust and as a basis for future mutually beneficial partnerships. From the analysis, the fourth sub-hypothesis **H4:** Trialability has a significant influence on e-business diffusion in the SME sector in Zimbabwe is accepted.

The analysis and discussion of the five technological dimensions confirm the main hypothesis of the study, albeit two of the factors posited as significant in the original model (relative advantage and observability) were discounted.

Therefore **H0**: **Technological dimensions have a significant influence on e-business diffusion in the SME sector in Zimbabwe** is

accepted.

The resultant empirical model derived from the findings and analysis of the data is depicted in **Figure 2**. This shows that out of the five dimensions given in the original Diffusion of Innovation Model, only three are considered significant in the SME sector in the current Zimbabwean market environment.

Final Study Model for Diffusion in the Zimbabwean SME sector market environment.

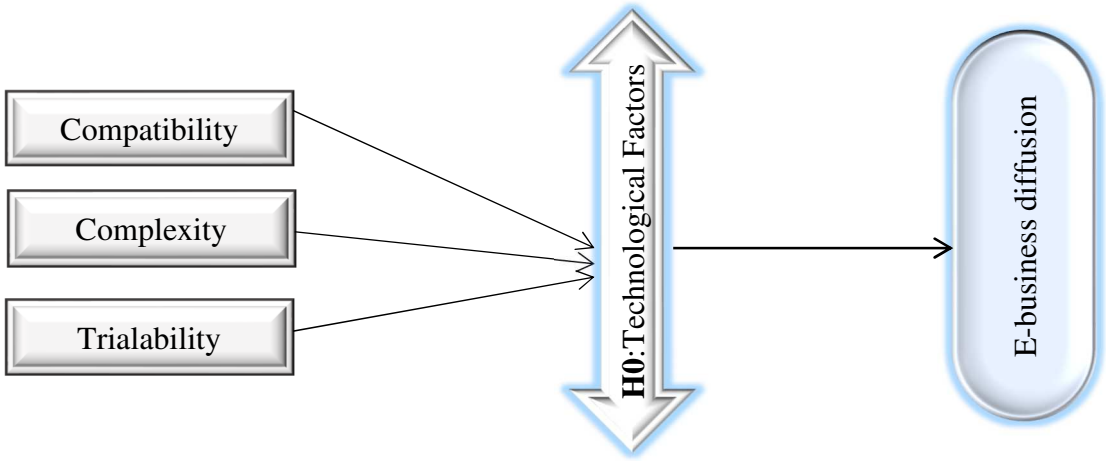

Figure 2: Facilitating factors for e-business diffusion

V. Conclusions And Recommendations

The results of this research show that the Zimbabwean small-to-medium enterprise sector is unique in view of what it considers important drivers of e-business technology. Out of the five dimensions, only three, namely, compatibility, complexity and trialability, registered a significant influence on e-business diffusion. This is a unique contribution to literature. Most researchers have selected these three factors in their studies to the exclusion of the other two (trialability and observability). This study has analysed all the five factors of the DOI theory to ascertain their influence on the adoption of e-business, specifically in the Zimbabwean SME sector. The research brought a new perspective to the literary domain in view of its finding which has shown that the dimension of 'relative advantage' is not universally influential on diffusion as posited by the majority of researchers. This is an indication of how the differences that exist in different markets in terms of business orientation, resource availability, perceptions, level of development, economic status and difference in the focus of the study, determine which of these factors are held important in technology adoption. Most studies that used Rogers' Diffusion of Innovation Theory (DOI) were based in the developed world or middle income countries which boast of more developed markets, resources and accessibility of information, compared to developing economies such as Zimbabwe. Zimbabwe's economy and its development agenda have been heavily affected by three decades of political, social and economic instability. This has obviously affected the perception of the nascent businesses regarding what is important in their respective business spheres with respect to technology adoption. The findings in this research also confirm the importance of testing the validity and reliability of measurement scales and construct validity for any new study to ensure the results are consistent with the target population of the specific research ([44], [73]). They posit that adopting a priori measurements from prior studies may affect the authenticity and generalisability of the results of the current research. This study confirmed the validity and reliability of the measurement scales and construct validity through exploratory and confirmatory factor analyses, principal component analysis and goodness fit tests to ensure the results were authentic and generalisable to the current study's target population. This gives the study a methodological uniqueness among other studies. The findings are also envisaged to be of benefit to technology developers and vendors on what critical elements they should take into account as they develop ICT applications for different markets, considering their respective business needs and perceptions.

To assist the SMEs to adopt the new technologies that facilitate e-business diffusion, the researcher emphasises the need for human resources ICT upskilling training programmes to equip the relevant staff with the understanding of how the technology works and appreciation of its benefits to the growth and survival of their business entities. This helps to integrate them with the rest of commerce and industry for national economic development. To achieve this, government needs to create an enabling environment for the SME sector by providing the critical financial resources for internal infrastructural development and human resource

upskilling and operational requirements. There is also need for government to ensure the revamping of the national ICT infrastructure to provide the communication backbone required for the integration of the SMEs' internal technological systems with the national and global business networks. The current ravaging COVID-19 pandemic has demonstrated the critical importance and urgency of technology diffusion as a survival model in a world where the customary face-to-face transactions, mostly preferred in the developing economies, have become more restricted. This is a strong pointer to the need for small-to-medium businesses to adapt to the current 'whirlwind' of change that has necessitated the adoption of virtual business models in order to survive and grow in a new business world created by this global phenomenon.

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