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EMMANUEL IFEDUBA

emmaifeduba@gmail.com

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Validation of Digital Publishing Innovation Adoption Framework

By

Emmanuel Ifeduba

Redeemer's University, Ede, Osun

Email: emmaifeduba@gmail.com Phone: 234 08033821430

Nkechi Christopher

University of Ibadan, Ibadan, Nigeria

ABSTRACT

Globally, digital publishing innovations have been shown to be effective in breaking down book production and distribution barriers. However, there has been a dearth of studies on digital publishing innovations (D.P.I.) in Nigeria, particularly as it relates to predictors of innovation adoption. This study, therefore, examined the extent to which perceived contextual factors and perceived relative advantage correlate with the extent of adoption of digital publishing innovations with a view to validating a framework to aid the adoption of digital publishing in developing environments. A framework modifying the diffusion of innovations theory and the Technology, Organisation, Environment theory was designed. A total of 109 copies of a questionnaire were administered on purposively selected publishers to test the framework, and data were analysed using correlation and multiple regression at the 0.05 level of significance. Findings indicate that perceived relative advantage ($r = 0.54$), market readiness ($r = 0.54$), business uncertainty ($r = 0.54$) and enabling facility ($r = 0.28$) had significant correlations with D.P.I. adoption. The four correlates had a strong joint prediction on adoption of D.P.I. ($F = 4.30$, $R^2 = .27$), accounting for 26.8% of its variance. Individually, the four variables were valid to predict the adoption level of different aspects of digital publishing, indicating that the framework is valid in predicting the adoption of digital publishing.

Background to the Study

In the past two decades, the world of publishing has experienced changes in publishing practices, and digital technology is increasingly applied to every aspect of the publishing process (Tucker, 2017). Book authoring processes, book formats, product variety, mode of distribution, promotion and consumption have all been influenced by advances in digital publishing technologies. Scholars seem to agree that the technological advances of the past two decades are revolutionizing publishing profoundly (Bruns, 2010; Wilson, 2014; Izenwasser, 2014). For instance, digital technology adoption has made publishing quicker and more efficient, enabling even small publishers to distribute globally (Wilson, 2014; Izenwasser, 2014) and e-book sales through various digital distribution platforms currently represents over 74% of some publishers' revenue in some developed nations (International Publisher's Association Newsletter, 2014). As this digital revenue stream is developing, widespread adoption and continued uploading of digital formats seem to contribute to the closure of traditional bookshops in some places and the introduction of online bookshops (Cabanellas, 2014; Setzer, 2014).

Thus, the thinking in the global publishing community is that the future of successful publishing is in the electronic formats, and that adopting them is becoming a matter of survival for publishers (Unesco, 2014). The launch of the Kindle, Ipad, Samsung Galaxy and the Sony Reader, and the massive adoption of these and other mobile reading devices in many developed and developing nations is not only changing content-consumption patterns, but also suggests that digital publishing has become a major area of growth (Bruns, 2010; Unesco, 2014). Notwithstanding, many publishers, especially in developing nations, find it extremely difficult to take the crucial first step towards adopting e-publishing.

Statement of Problem

Globally, digital publishing innovations have been shown to be effective in breaking down book production and distribution barriers (Wilson, 2014) . However, there has been a dearth of studies on digital publishing innovations (D.P.I.) in Nigeria, particularly as it relates to predictors of innovation adoption. This study, therefore, examined the extent to which contextual factors (perceived enabling facilities, market readiness and business uncertainty) and perceived relative advantage correlate with the extent of adoption of digital publishing innovations (digital hardware, digital book formats, e-promotion and e-commerce). The ultimate aim is to validate a framework to increase predictability in the innovation adoption process and to aid publishers in adopting digital publishing innovations.

Research Questions

RQ 1: What is the extent of adoption of digital publishing innovations in Nigeria?

RQ 2: Can digital publishing innovation adoption level be predicted from the state of contextual factors?

RQ 3: Can innovation adoption level be predicted from relative advantage offered by digital publishing?

Review of Relevant Technology Innovation Adoption Theories

Innovation adoption literature is replete with theoretical models for the study of different aspects of innovation. These theories include the Diffusion of Innovations Theory (DIT) propounded by Rogers (1983) and modified (1995 and 2003), which is widely employed in technology adoption studies across disciplines (Wade, 2009); the Technology Acceptance Model, TAM, (Davis 1986, 1989 and Davis et al, 1989), Theory of Planned Behaviour, TPB (Ajzen, 1985; Ajzen, 1991), Unified Theory of Acceptance and Use of Technology, (UTAUT) proposed by Venkatesh *et al* (2003) and the Technology-Organization-Environment theory proposed by Tornatzky and Fleischer (1990). Other theories and frameworks include the Theory of Reasoned Action, TRA; Institutions Theory, IT; Technological Determinism Theory, TDT; Task-Technology-Fit Model, Media Convergence Theory and Uses and Gratifications Theory; The Motivational Model, MM; The Model of PC Utilisation and the Socio-Cognitive Theory, SCT (Taiwo and Downe, 2013; Abu, Jabar and Yunus, 2014).

Of all the listed theories, models and frameworks, the most frequently used in connection with digital technology adoption are DIT, TAM, TPB, TDT, UTAUT, and TRA. But in terms of perspective and focus, the TAM, TPB, TRA and UTAUT are primarily designed for individual adoption, a fact which makes them unsuitable for the present study

which is focused on the organization as unit of adoption. This leaves the study with the diffusion of innovation theory and the technology-organization-environment theory in which the organization is the unit of adoption. These two theories also cover the context, environment or social system which is the focus of this study. Whereas the D.I.T. uses the term “social system” to describe the relevant aspects of the environment, the T.O.E theory uses the term “environment context.”(Oliveira and Martins, 2011; Taiwo and Downe, 2013; Abu, Jabar and Yunus, 2014).

Although earlier works did not combine these two theories in one study, Zhu et al (2006) argued that adoption trend in organizations can be best understood by combining both innovation characteristics and contextual factors in a model. Oliveira and Martins also argued that better results are likely to be achieved when the Technology-Organisation-Environment is combined with a model like the DIT which also emphasizes innovation characteristics. For this reason, different constructs are borrowed from the Diffusion of Innovations Theory and the technology-organization-environment framework to propose a conceptual framework for predicting digital publishing innovation adoption. A detailed review of the two is presented as follows:

Diffusion of Innovations Theory (DIT): The Diffusion of Innovations Theory propounded by Rogers (1983) and amplified in the 1995 and 2003 editions of his book, *Diffusion of Innovations*, identified innovation characteristics, communication channels, time, social-system and change agents’ promotion efforts as five elements of diffusion. The five innovation characteristics described by Rogers are relative advantage, compatibility, complexity, trialability and observability (Sahin, 2006).

The diffusion of innovations theory emphasizes that adoption of innovation generally involves five major steps – knowledge, persuasion, decision, implementation and confirmation. More and Benbasat (1991) enhanced the innovation characteristics proposed by Rogers and increased the variables to eight. He accomplished this by renaming complexity as “ease of use” segregating the concept of “image from relative advantage. He also segregated visibility and result demonstrability from observability and added the concept of voluntariness of use. Wei and Ismail (2009) suggested that persuasion was the most critical step in explaining individuals decision to adopt an innovation (Abukhzam, and Lee, 2010; Boston University School of Public Health, 2013).

The concept of observability which had been divided into “visibility” and “results demonstrability” by Moore and Benbasat was further broken down by Campeau, Meister and Higgins (2007) into “dimensions of communicability” “measurability” and “others use.” But Wei and Ismail (2009) explained that business entities were likely to benefit more from the concepts of measurability and communicability because firms are often interested in observing the results achieved by early adopters before taking adoption decision if the impact can be measured in terms of revenue or competitive advantage, then, a firm is more likely to adopt. But where the impact is not measurable and difficult to communicate to others, a firm is more unlikely to adopt. This theory, according to Eger (2003) may not be effective if used alone for organization-based adoption because of its focus on the individual as unit of adoption, thus other studies focusing on organizational adoption have used it with modifications (Moore & Benbasat, 1991; Rottman and Lacity, 2006; Gemino et al, 2006; Arpaci et al, 2012).

Extant innovation adoption literature indicate that inconsistent or non-interpretable findings have been reported for observability and trialability whereas many studies found that relative advantage consistently and positively correlated with adoption of innovations in organizations (Al-Gaith, Sanzogni & Sandhu, 2010). Advantages that correlate with adoption

of technology include expediency, cost-saving, profit, time-saving and convenience. Firms also adopt digital innovations for promotion, competition, customer relations, new business opportunities and customer interaction. These findings vary from industry to industry and often depend on the nature of products and services as well as environments within which the surveyed businesses operate (Tom and Teo, 2000; Polatoglu and Ekim, 2001; Al-Gaith, Sanzogni and Sandhu, 2010; Aboelmaged, 2010; Venkatesh, Thong; Xu, X, 2012; Aboelmaged and Gebba, 2013).

Technology-Organization-Environment Theory: The technology-organization-environment theory was propounded by Tornatzky and Fleischer (1990) to provide an organization-based framework for technology adoption. The theory assumes that there are three contexts that affect the process of adopting or accepting innovations in organizations. These contexts are: Technology context, organization context, and environment context (Oliveira and Martins, 2009). The three contexts present “both constraints and opportunities for technological innovation” (Tornatzky and Fleischer, 1990). Thus, these three elements influence the way a firm sees the need for, searches for, and adopts new technology. The three elements as represented in the model below are technology context, organization context and environment context (Oliveira and Martins, 2009; Oliveira and Martins, 2011).

Technology Context refers to the availability of technologies important to the firm’s operations, both internally and externally. These, according to Oliveira & Martins (2011) are technologies that might be useful in improving productivity in that organization. The more available such technologies are, the greater the likelihood of adopting a new technology. The less available they are the more unlikely organizations will adopt innovations.

Organization Context: Tornatzky and Fleischer (1990) explain that all the resources available within the organization to support the adoption of the innovation in question constitute the organization context. The more available the resources are the greater the likelihood of adopting innovations. Where they are not available, it could be predicted that rate of adoption will be low. These predictors include scope of operation, firm size, degree of centralization and formalization, interconnectedness, complexity of the material structure as well as the quality and availability of required human resources in the firm (Oliveira and Martins, 2011; Arpaci et al, 2012).

Environment Context: This framework assumes that the setting or environment is influenced by the industry itself, its competitors (e.g. other publishing houses) the firm’s ability to access resources supplied by others as well as interaction with government, regulatory bodies, policy-making bodies and partners or peers (Oliveira and Martins, 2011; Arpaci et al, 2012).

Due to the fact that none of these two theories provide sufficient relevant frames for the present study, attempt is made to anchor the study on a framework combining relevant elements of the two. Whereas the TOE framework covers the contextual factors adequately, it fails to cover innovation characteristics, especially the possible advantages offered to commercial publishers who publish for profit. Thus, a relevant sub-variable (relative advantage) is adapted from DITs innovation characteristics. This approach has been adopted in many other technology adoption studies (Wang et al, 2010; Oliveira and Martins, 2011; Hameed, Counsell and Swift, 2012; Nai-Hua and Huang, 2015). Details of previous combinations are presented in Table 1:

Table 1: Studies Combining TOE Framework with other Theoretical Models

SN	Author(s)	Year of Publication	Theoretical Models	Discipline
1	Wang et al	2010	TOE and DIT	RFID

2	Chong et al.	2009	TOE and DIT	Collaborative Commerce
3	Li	(2008)	TOE, DIT and Institutional Theory	E-procurement
4	Soares-Aguiar and PalmaDos-Reis	2008	TOE and Institutional Theory	E-procurement
5	Zhu et al.	2006	TOE and DIT	E-business
6	Hsu et al.	2006	DIT, TOE and Iacovou et al. (1995) Model	E-business
7	Vaidya and Nandy	2004	TOE and DIT	E-business
8	Gibbs and Kraemer	2004	TOE and Institutional Theory	E-commerce
9				
10	Kuan and Chau	2001)	TOE and Iacovou et al. Model	EDI
11	Thong	1999)	TOE and DIT	Software Applications
12	Lee	1998)	TOE and DIT	(Internet-Based Financial EDI
13	Higa et al.	(1997	TOE and DIT	Telemedicine

(Adapted from Oliveira and Martins (2011) Arpaci et al (2012)

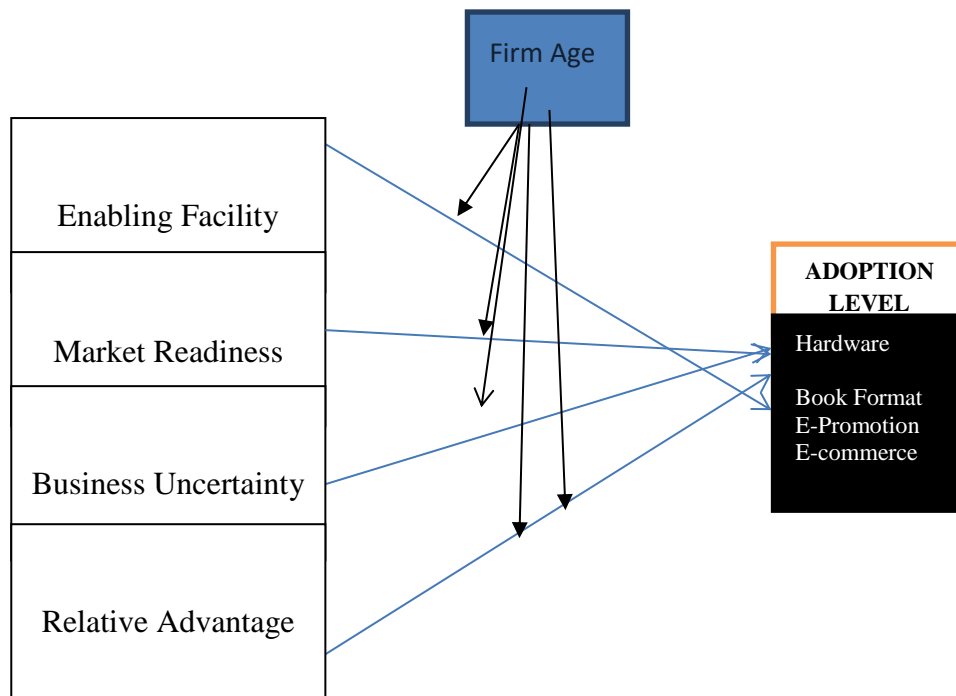
Conceptual Framework

From the TOE framework, “industry characteristics” was adapted and modified as “business uncertainty” and made a major construct. Whereas the sub-constructs (regulation and collaboration) have been studied within the framework of both theories in several studies (Lippert and Govindarajulu, 2006; Chong et al, 2009; Wang et al, 2010; Philips, 2014), uncertainty in curriculum, book adoption criteria and market size are introduced to suit this study. The concept of “market structure” present in the same TOE framework is modified in this study as “market readiness” with four new sub-constructs (consumer readiness, school readiness, library readiness and author readiness) considered to be more relevant to the environment under study (Puschel, Mazzon and Hernandez, 2010).

Tornatzky and Fleischer’s “technology support infrastructure” is modified as “enabling facilities” with new sub-constructs (power supply, telecommunication bandwidth, Internet service provider, ISP, digital content developers and postal system). Financial facilities, that is, “access to capital” and “e-payment instruments”, original to this study, are added because they are relevant both to the setting of the study and the subject matter (Oliveira and Martins, 2011; Arpaci et al, 2012, Jittidecharak, 2011; Scott, 2012).

The adaptations from the TOE framework were, however, considered inadequate to cover the commercial benefits resulting from digital publishing, especially given that the firms under investigation are made up of about 70% commercial publishers. Thus, this study adapts “relative advantage” from Diffusion of Innovations Theory. To this variable, the following new sub –constructs deemed more applicable to the environment under study are added: profit advantage, export advantage, time-saving, cost-saving and socialising advantage. On the basis of these adaptations, modifications and conceptualizations, a conceptual framework for this study is proposed:

Figure 1:



Proposed Conceptual Framework for Facility, Market Uncertainty and Advantage (FMUA) Framework.

The one-way arrows in the framework suggest relationship between the independent variables and extent of adoption, but the extent of adoption does not influence the variables in any way. All arrows suggest relationship and not causation.

A relationship between “enabling facilities” and the extent of adoption is assumed based on prior research evidence that publishers would not adopt an innovation for which they have insufficient facilities to enable optimal output at reasonable cost, since digital technology adoption is often highly dependent on electricity supply, Internet bandwidth, availability of Internet service providers, reliable postal services and payment instruments (Zhu et al, 2003; Iwuh, 2011). This prediction is based on the theoretical proposition that publishers would not adopt an expensive technology when there is neither the required capital nor sufficient access to affordable bank loans (Pan and Jang, 2008; Teo et al, 2006; Iwuh, 2011).

A relationship between the extent of adoption of digital publishing innovations and “market readiness” is predicted based on research evidence that publishers would not adopt a service, product or procedure if they are not certain that both the end users (readers) and the industrial buyers (schools, libraries) are ready to accept such services, products or processes (Lin and Lin, 2008; Zhu et al, 2003; Wang et al, 2010). Publishers would also naturally be unwilling to adopt digital formats if the authors of their books are not ready to publish their works in digital formats (Batambuze, 2011).

A relationship between “business uncertainty” and the level of adoption of digital innovations is predicted based on the theoretical proposition that publishers would not adopt a publishing technology, method or practice if they are not certain that the size of the market will make adoption profitable, or that they would get the collaboration of other industry players needed for networking, lobbying etc. Such relationship is also predicted on the basis that publishers would not adopt a technology if they are not sure of government policy on it as this may lead to waste of resources and expensive, fruitless litigations (Pan and Jang, 2008; Teo et al, 2006; Zhu et al, 2006, Ballhause, 2011; Amadi, 2011).

In the same vein, a relationship between the trend of adoption of digital publishing innovations and “relative advantage” is predicted based on research evidence that firms would not adopt an innovation except they are certain that introducing it would offer them opportunity to increase profit, export titles that were hitherto difficult to export and secure networking advantages (Kuan & Chau, 2001; Lee et al, 2009; Aptara, 2012; Wilson, 2014).

Methodology

Data were collected from 109 publishing firms. Employing a survey design, 92 active members of the Nigerian Publishers’ Association and 17 active non-members listed on Internet directories were purposively selected (Wimmer and Dominick, 2011). Over 67% of the responses came from publishers with years of experience above five years while less than five percent have less than five years of experience. Their level of experience was, thus, considered adequate for participating in the survey.

Initial validity was assessed by Principal Component Analysis, which indicated that factor loadings for 21 variables were strong (.60–.79). The other items that were not so strong were, however, retained because of the communality they share with the strong items. Reliability was tested by Cronbach Apha computations and the Cronbach’s Alpha values ranged from .763 to .889. Data were analysed using correlation and multiple regression at the 0.05 level of significance. The variables were assigned codes for the purpose of analysis, and presented in Table 2:

Table 2: Variables and their Codes

SN	Variable	Code
1	Enabling Facilities	EF
2	Market Readiness	MR
3	Business Uncertainty	BU
4	Relative Advantage	RA
5	Digital Publishing Innovations	DPI

Data Presentation and Discussion

A digital book format, Portable Document Format (PDF), 34.0%, and an e-promotion innovation, social networking (33.0%) were more extensively adopted, while e-commerce (24.1%) and digital hardware (11.5%) recorded lower levels of adoption. Perceived relative advantage (r = 0.54), market readiness (r = 0.54), business uncertainty (r = 0.54) and enabling facility (r = 0.28) had significant correlations with D.P.I. adoption.

Stages of Adoption: To establish a clear profile of the respondents’ adoption level, in line with Rogers’ (1995) diffusion of innovation stages, they were asked to indicate the stage at which they were in the adoption process on a scale of five—already in use, plan to adopt soon, interested but has no immediate plan, just aware and not aware. Their responses are presented in Figure 2:

Figure 2: Stages of Adoption across the Four Innovation Types

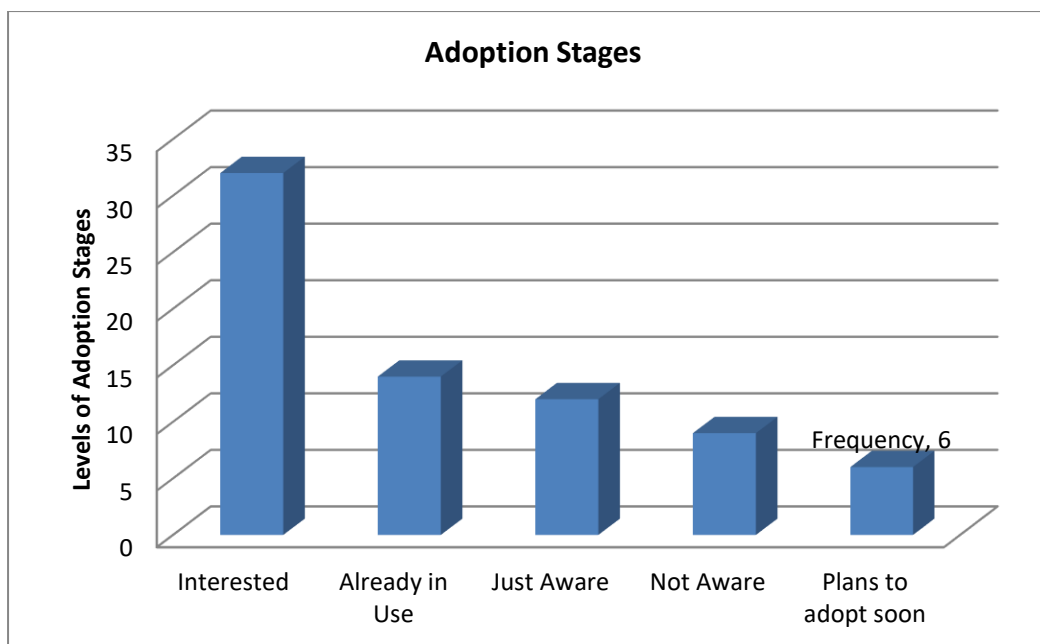


Figure 4 indicates that the majority of the publishers are not only aware of digital publishing but that interest is high among them. From Rogers' (1995) five-step adoption decision process-- knowledge, persuasion, decision, implementation and confirmation-- it could be said that the majority of the surveyed publishers have progressed beyond the awareness and persuasion stages yet they have not adopted. This suggests that some contextual factors may be responsible for this adoption behaviour.

Measure of Relationships

Four hypotheses were tested to assess the relationship of enabling facilities, market readiness, business uncertainty and relative advantage with the adoption level of digital publishing innovations. The findings are presented in this section.

Enabling Facilities: It was hypothesized that there is no relationship between the extent of adoption of digital publishing innovations and perceived adequacy of enabling facilities, but the statistical tests indicated that perceived adequacy of enabling facilities had a significant relationship with the adoption of book format and e-commerce innovations. Thus, the findings do not support the hypothesis.

Market Readiness: It was hypothesized that there is no relationship between the extent of adoption of digital publishing innovations and perceived market readiness. However, there was a statistically significant relationship between the adoption of book format innovations, e-promotion, e-commerce and perceived market readiness.

Business Uncertainty: It was hypothesized that there is no relationship between the adoption level of digital publishing innovations and perceived business uncertainty. However, there was a statistically significant relationship between the adoption level of these four innovations and perceived curriculum uncertainty when weak variables were isolated.

Relative Advantage: It was hypothesized that there is no relationship between the adoption level of digital publishing innovations and perceived relative advantage. However, there was a statistically significant relationship between the adoption level of e-promotion innovations as well as e-commerce innovations and perceived cost-saving advantage. Thus, because of these relationships, the findings did not support the hypothesis. Details are presented in Table 3

Table 3: Relationships with Adoption level of Hardware, Book Formats, E-promotion, E-commerce and Overall DPI

Variables	Relationship With	Pearson R.	P. Value
Hardware	EF	.283	.049
Book Formats	EF, MR, BU, RA	.536	.005
E-Promotion	EF, MR, BU, RA	.535	.005
E-Commerce	EF, MR, BU, RA	.537	.002
DPI	EF, MR, BU, RA	.591	.007

Regression Validation of the Model

Four types of digital publishing innovation: hardware, book format, e-promotion and e-commerce innovations, were used to test the model. Results are presented as follows:

Hardware and EF, MR, BU and RA

To assess the joint predictive strength of the model, a multiple regression analysis was conducted and the results for the adoption level of hardware innovations indicate that the model (P-value .376) was not statistically significant in predicting the adoption level of digital hardware innovations overall at 0.05 level. The R. Square value of the model was .090, meaning that only 9% of the variance in the adoption level of hardware innovations could be explained by EF, MR, BU, and RA together. However, further analysis was conducted excluding MR, BU, and RA, and the results indicate that EF was significant with a P- value of .049 at 0.05 level. The R-Square value of the model was .080 meaning that 8% of the variance in the adoption level of digital hardware innovations could be explained by EF alone. The B weight was .283. This means that if perceived adequacy of enabling facilities increased by one unit, the adoption level of digital hardware innovations would increase by .283. Conversely, if perceived adequacy of enabling facilities decreased by one unit, adoption level of digital hardware innovations would decrease by .283. Details are presented in Table 4:

Table 4: Analysis of Variance, Significance and Relationship for Hardware Adoption level

ANOVA								
Model		Sum of Squares	DF	Mean Square	F	Sig	R. Square	B. Weight
1	Regression	4.263	1	4.263	4.094	.049	.080	.283
	Residual	48.941	47	1.041				
	Total	53.204	48					

Predictors: (EF).

Digital Book Formats and EF, MR, BU and RA

To assess the joint predictive strength of EF, MR, BU, and RA on the adoption level of digital book formats after the removal of the weak sub-variables, a multiple regression analysis was conducted with these four variables. The results indicate that the model with P-value 0.005 was statistically significant in predicting the adoption level of digital book format innovations at 0.05 level. The R-Square value of the model was .288. This means that 28.8% of the variance in the adoption level of digital book format innovations could be explained by EF, MR, BU, and RA together. Details are presented in Table 5:

Table 5: Analysis of Variance, Significance and Relationship for Book Format Adoption

ANOVA							
Model		Sum of Squares	DF	Mean Square	F	Sig.	R. Square
1	Regression	20.028	4	5.007	4.342	.005	.288
	Residual	49.592	43	1.153			
	Total	69.620	47				

a. Predictors: (constant) EF, MR, BU and RA

Further analysis excluding EF, BU and RA indicated that MR was highly significant in predicting the adoption level of digital book format innovations with a P-value of .000 at 0.05 level. The R-Square value of the model was .242 meaning that 24.2% of the variance in the adoption level of book format innovations could be explained by market readiness alone. The B-weight was 0.492. This means that if perceived market readiness increases by one unit, the adoption level of digital book formats would increase by .492. Conversely, if perceived market readiness decreases by one unit, the adoption level of digital book formats would decrease by .492. In other words, market readiness is the variable that plays significant role in the adoption level of book format innovations. Details are presented in Table 6:

Table 6: Analysis of Variance, Significance and Relationship for Book Format Adoption Extent

ANOVA								
Model		Sum of Squares	DF	Mean Square	F	Sig	R. Square	B. Weight
1	Regression	16.845	1	16.845	14.683	.000	.242	.492
	Residual	52.775	46	1.147				
	Total	69.620	47					

Predictors: (constant) MR,

E-Promotion and EF, MR, BU and RA

To assess the joint predictive strength of perceived EF, MR, BU, and RA on the adoption level of e-promotion, a multiple regression analysis was connected. The results indicate that the model (P-value .005) was significant in predicting the adoption level of e-promotion innovations at 0.05 level. The R-Square value of the model was .287, meaning that 28.7% of the variance in the adoption level of e-promotion innovations could be explained by perceived EF, MR, BU, and RA together. Market readiness producing a P-value of .002 at 0.05 level; R-Square value was .191, meaning that 19.1% of the variance in the adoption level of e-promotion could be explained by MR alone with .438 B-weight. This means that if perceived market readiness increased by one unit, the adoption level of e-promotion innovations would increase by .438. Conversely, if perceived market readiness decreases by

one unit, adoption level of e-promotion innovation would decrease by .438. Details are presented in Table 7:

Table 7: Analysis of Variance, Significance and Relationship for E-Promotion

ANOVA								
Model		Sum of Squares	DF	Mean Square	F	Sig	R. Square	B. Weight
1	Regression		1	13.891	10.893	.002	.191	.438
	Residual		46	1.275				
	Total		47					

Predictors: (constant) MR,

E- Commerce and EF, MR, BU and RA

To assess the joint predictive strength of perceived EF, MR, BU, and RA on the adoption level of e-commerce, a multiple regression analysis was conducted and the results indicate that the model, (P-value .002), was significant in the adoption level of e-commerce innovations at 0.05 level. The R. square value of the model was .288, meaning that 28.8% of the variance in the adoption level of e-commerce innovations could be explained by EF, M,R, BU, and RA together. The B-weight of model one (MR) was .345 whereas the B-weights of model 2 were .411 for MR and .322 for RA. This means that if perceived market readiness increased by one unit, the adoption level of e-commerce innovations would increase by .345 using model one. Conversely, if perceived market readiness decreases by one unit, the adoption level of e-commerce innovations would decrease by .345. Using model two, if perceived market readiness increases by one unit, the adoption level of e-commerce innovations would increase by .411. Conversely, if perceived market readiness decreases by one unit, the adoption level of e-commerce innovations would decrease by .411 and *vice versa*. Details are presented in Table 8:

Table 8: Analysis of Variance, Significance and Relationship for MR Model (1)

ANOVA								
Model		Sum of Squares	DF	Mean Square	F	Sig.	R. Square	B. Weight
1	Regression	8.035	1	8.035	6.894	.011	.119	.345
	Residual	59.437	51	1.165				
	Total	67.472	52					
2	Regression	14.726	2	7.363	6.980	.002	.218	-.322
	Residual	52.746	50	1.055				
	Total	67.472	52					

Predictors: (constant) MR, RA,

Regression of DPI with EF, MR, BU, RA

To assess the joint predictive strength of EF, MR, BU, and RA, with regard to all the four digital publishing innovations together, a multiple regression analysis was conducted. The results indicate that, overall, the model with p-value .007 was significant in predicting the adoption level of digital publishing innovations (DPI) at 0.05 level. The R-square value of the model was .350, meaning that 35% of the variance in the adoption level of the four innovations (hardware innovations, book format innovations, e-promotions innovations and

e-commerce innovations) could be explained by the perceived EF, MR, BU, and RA together. The B-weight of MR was .499. Details are presented in Table 9:

Table 9: Analysis of Variance, Significance and Relationship for DPI with EF, MR, BU, RA

ANOVA							
Model		Sum of Squares	DF	Mean Square	F	Sig	R Square
1	Regression	12.777	4	3.194	4.303	.007	.350
	Residual	23.753	32	.742			
	Total	36.530	36				

Predictors: (constant) EF, MR, BU and RA.

To assess the relative predictive strength of each variable (EF, MR, BU, and RA) with regard to DPI, a multiple regression analysis was conducted. The results indicate that only MR with p-value .001 was significant in the adoption level of digital publishing innovations at 0.05 level. The R-Square value was .268, meaning that 26.8% of the variance in the adoption level of digital publishing innovations could be explained by perceived market readiness. The B-weight of MR was .518. This means that if perceived market readiness increases by one unit, the adoption level of digital publishing innovations (DPI) would increase by .518. Conversely, if perceived market readiness decreases by one unit, the adoption level of digital publishing innovations would decrease by .518.

Dropped Sub-variables

A total of 11 potent sub-variables were retained as proposed and two--venture capital and e-payment instrument--were merged and re-labeled “financial facilities” whereas a total of 9 weak sub-variables were dropped. One major variable, business uncertainty, was re-labeled “curriculum uncertainty” to reflect the change in the revised variable whereas new codes (EF, MR and RA) were also assigned to EF, MR and RA. Details are presented in Table 10:

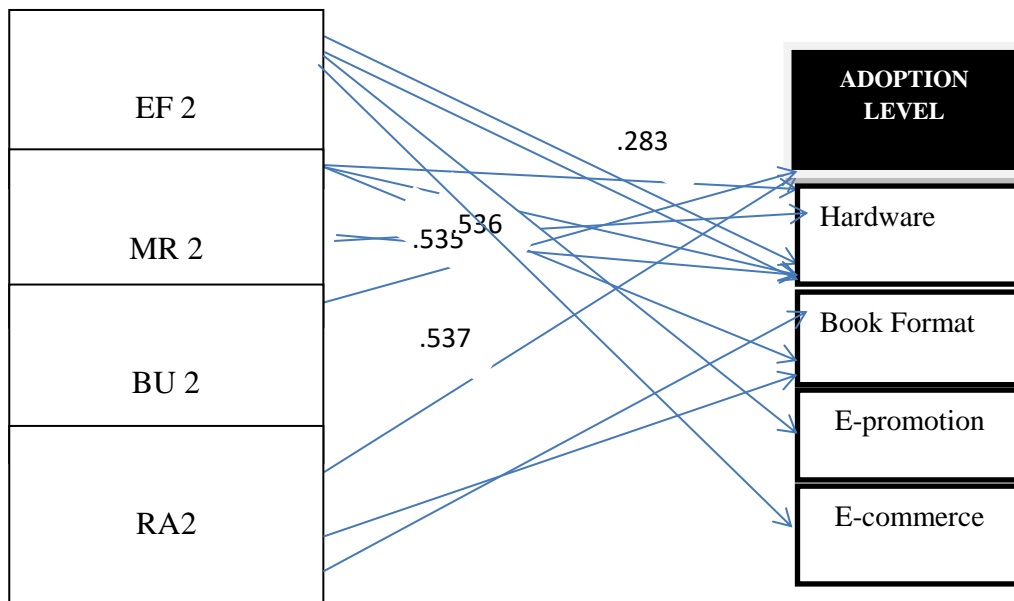
Table 10: Dropped and Modified Sub-variables

Major Variables	Dropped Sub-Variables	Retained Sub-Variables	Current Label
Enabling Facilities	Power supply, Telecommunication bandwidth, postal facilities	ISP, Digital Content Development, Financial facilities	Enabling Facilities
Market Readiness	NONE	All	Market Readiness
Business Uncertainty	Regulation, collaboration, market data and Book recommendation criteria uncertainty	Curriculum Uncertainty	Busines Uncertainty
Relative Advantage	Time-saving and Socializing Advantage	Profit, Export and Cost Advantage	Relative Advantage

Reconstructed Framework and Revised Propositions

To reflect the difference between the initially proposed framework and the validated version, the validated framework is presented in this section. The framework indicates that only perceived adequacy of enabling facilities has significant relationship with the adoption level of hardware innovations whereas there was a statistically significant relationship between perceived EF, MR, CU, RA and the adoption level of all book format, e-promotion and e-commerce innovations. Details are presented in Figure 2:

Figure 2:



Reconstructed Framework of Facility, Market Uncertainty and Advantage Model

Revised Propositions

Enabling Facilities

H1. There is a significant relationship between the extent of adoption of digital publishing innovations and perceived level of adequacies of enabling facilities in the Nigerian business environment.

Market Readiness

H2. There is a significant relationship between the extent of adoption of digital publishing innovations and perceived level of market readiness in Nigeria.

Curriculum Uncertainty

H3 There is a significant relationship between the extent of adoption of digital publishing innovations and perceived uncertainties in educational curriculum in Nigerian.

Relative Advantage

H4. There is a significant relationship between the extent of adoption of digital publishing innovations in Nigeria and perceived relative advantage derivable from digital publishing innovations.

Conclusion

The four correlates had a strong joint prediction on adoption of D.P.I. ($F = 4.30$, $R^2 = .27$), accounting for 26.8% of its variance. Perceived market readiness ($\beta = 0.52$) had significant

relative prediction on D.P.I. adoption and accounted for 24.7% of the variance in D.P.I. adoption. Perceived enabling facility ($\beta = 0.28$) and perceived relative advantage ($\beta = 0.35$) had significant relative predictions each on hardware adoption and e-commerce adoption respectively; while perceived market readiness had the strongest relative prediction on digital book format adoption ($\beta = 0.48$), e-promotion adoption ($\beta = 0.43$) and e-commerce adoption ($\beta = 0.41$). On the basis of these findings and results, this study concludes that the facility, market uncertainty and advantage (FMUA) framework is valid in predicting digital publishing innovation adoption, especially in developing environments where these variables play important roles in publishing.

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