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RESEARCH ARTICLE

Electronic Publishing Adoption Maturity Model for Kenya's Educational Publishers

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ABSTRACT

The adoption of electronic publishing (e-publishing) technologies is disrupting the traditional publishing industry. Kenyan educational publishers are reliant on print publishing; however, they are increasingly coming under pressure to adopt the new technology, with the change in curriculum being a catalyst. Unfortunately, there exists no framework to guide the adoption of digital publishing in the country. This study, therefore, aimed to investigate the extent of electronic publishing adoption, key resources necessary for the successful adoption of e-publishing by educational publishers in Kenya, and to create an adoption framework for this purpose. The study employed the Technology, Organisation, and Environment (TOE) Framework as its theoretical framework. This study was a mixed-methods research design, specifically a concurrent mixed-methods design. The research population was limited to educational publishers in Kenya who are registered with the Kenya Publishers Association. The study used a census for publishers. The respondents were 15 publishing firms. The data was collected through structured interviews. The data was coded and quantitatively analysed using SPSS, performing correlations and regressions. The regression model findings showed that technology (0.087), organisational culture (0.073), and organisational structure (0.069) had the most significant influence on the adoption of digital publishing. The study also proposes an Electronic Publishing Adoption Maturity Model (EPAMM) to gauge the extent of e-publishing adoption by educational publishers in Kenya. The proposed maturity model will provide publishers with a roadmap for adoption as well as a means for evaluating progress on it. This will enable publishers to identify areas of weakness and resolve them strategically.

1 | Introduction

Electronic publishing or e-publishing is not a new phenomenon in the publishing industry. The earliest access to digital publications online can be traced back to 1971, with the establishment of Project Gutenberg by Michael Hart, whose goal was to digitise well-known published classics and make them available for free to everyone[1]. Over the years, the e-publishing industry has grown to a $14.92 billion industry by 2025, with projections reaching $15.87 billion by 2030[2]. E-publishing technology can be considered a disruptive technology in the publishing industry. Gordart and Pistilli [3] discuss the typology of disruption in industries, explaining that multifaceted disruptions affect not only the use of technology in the industry but also the business model, legal frameworks, and social movements. E-publishing is a multifaceted disruption to the publishing industry. Its adoption has changed e-publishing, which has altered the nature of the book as we know it, in more ways than its format. However, this represents a major technological shift that affects the mode of production and distribution. It has changed the business model by creating new value, such as readers paying for chapters of a book rather than the whole, or online bookstores like Amazon lending books on a subscription basis, similar to libraries or streaming services. The adoption of e-publishing has led to strain on existing regulatory frameworks regarding copyright, due to the leasing versus ownership model of the ebook business, which conflates piracy and book lending as the same thing [5]. As a social movement, there has been a rise in independent and self-publishers taking advantage of the convenience and affordability of e-publishing technology to bypass publishers and create and sell books directly to readers, enjoying reduced entry barriers to the industry as well as higher royalties[6].

The adoption of e-publishing has been much slower among developing nations. A 2025 report by UNESCO on the African book industry indicated that Africa lags in publishing, with the continent contributing only 5.4% to the global publishing industry. Among the challenges cited were over-reliance on foreign publications, insufficient and unstructured policies to guide and support the industry, as well as low investment in the industry[7]. Despite the challenges, African countries are gradually adopting e-publishing technologies, mainly through the use of digital platforms for ebook publications and sales, such as ekitabu (Kenya), afribookhub (Cameroon), and Sanpplfy (South Africa) [7].

2 | Literature review

The traditional publishing industry has established models that identify the stakeholders and their roles. Typically, the author, the publisher, the printer, the bookseller and the reader are identified as being the key players in the industry. These early models exhibited rigidity in the roles of the players, with authors serving as the primary source of manuscripts, publishers acting as investors and producers, printers functioning as manufacturers, and booksellers acting as distributors [8]. Later models, such as Adams and Baker's new model for the study of the book, looked beyond the book production process and visualised the book industry as a socio-economic conjecture, identifying influences on publication which included intellectual, political, legal and religious, commercial pressures, as well as social behaviour and taste [9]. These influences would affect the manufacture, distribution, survival and reception of the books in the market.

The dawn of e-publishing brought new models for the publishing industry. However, the focus has been on creating or evaluating new business models in the industry, with a specific emphasis on exploiting new technology for financial gain [10-12]. Emerging business models for the digital publishing industry include, among others, subscription-based models over direct sales, such as pay-per-page models and freemium models, where free access is provided for the first chapters of the book, with the remaining content upsold. Other models include open-access models, donation-based models, and eBook lending models. These models, while helpful, focus on the end product (sales) rather than the entire framework of the publishing industry. This limits their applicability in guiding the adoption of E-publishing.

The publishing industry lacks a comprehensive framework for the adoption of electronic publishing, especially among developing nations. Studies on the subject have focused on specific elements of adoption rather than adopting a holistic approach. Gaiher[12] investigated the benefits of digital publishing among publishers in South Africa and proposed a prescriptive checklist for publishers intending to adopt digital publishing. Mutia[13] investigated the effect of technologies on business strategies of publishers in Kenya, with longhorn publishers as a case study, indicating it only contributed to 9.7% of the change in business strategy, Ani and Ogboh[14] studied adoption of digital publishing among publishers in Southeast Nigeria, however their focus was on the barriers towards adoption rather than a framework for adoption, Ifeduba and Christopher[15] came closest to a framework, however they focused on validating a predictive model for adoption of innovation by publishers rather than an adoption framework.

3 | Theoretical framework

The technology-organisation-environment (TOE) framework, proposed by Tornatzky and Fleischer [16], argues that the adoption of a new technology by an organisation is influenced by three main factors: the technology, the organisation, and the environment. Technology refers to the characteristics of the technology, its complexity, compatibility, and relative advantage to the organisation intending to adopt it. The organisation refers to internal factors that will affect the way the organisation accepts the technology. These include management decisions, financial resources, the size of the organisation, and the knowledge held by employees. The environment encompasses external business environment factors, such as government support, competitive pressure, and support from business partners. Awa et al. [17] used the framework to investigate the adoption of enterprise resource software and expanded it by adding twelve (12) factors to the model. Under technology, they added ICT infrastructure, technical know-how, perceived compatibility, perceived values, and security of technologies. As part of the organisation, they considered the size of the firm, its demographic composition, subjective norms, and the scope of business operations. In this environment, they expanded it to include external support, competitive pressure, and trading partners (see Figure 1).

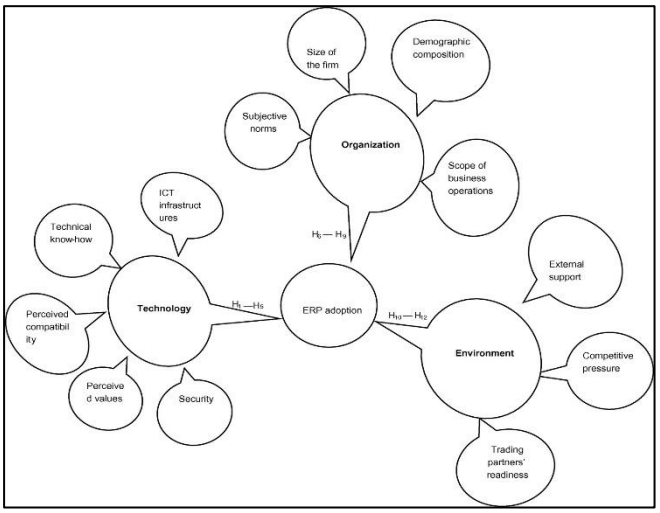

FIGURE 1 | Technology-organisation-environment framework
Source: Awa et al. [17]

To identify the variables for investigation for the study, this research reviewed Bumann and Peter [18], who conducted a review of the action field for digital transformation and digital maturity models, identifying the six most commonly applied dimensions for digital and business maturity models. These include technology, culture, strategy, organisation, customers, and people. In the context of the publishing industry, these six elements remain important; however, there is a need to consider that e-commerce plays an important role in the

distribution and sale of the final electronic product. The researchers, therefore, replaced the six elements with e-commerce customers. The study also reviewed the Stages of Growth model by McKay et al. [19]. This maturity model evaluates the level of maturity of organisations in conducting electronic commerce. The SOG-e model, as illustrated in Figure 2, comprises six stages and focuses on e-commerce, referred to by the researchers as Internet Commerce (IC). The six stages of the SOG-e model are no presence, static online presence, interactive online presence, Internet commerce, integrated organisation, and extended organisation. At each level, the model focuses on seven attributes, namely, strategy, structure, systems, staff, style, skills, and superordinate goals. These attributes are borrowed from the stages of growth maturity model for Information Technology (IT) developed by Galliers and Sutherland [20].

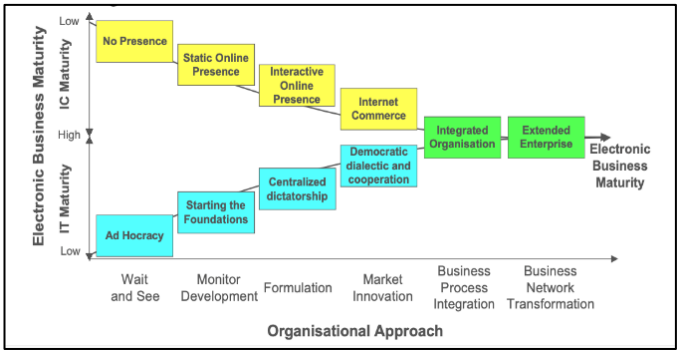

FIGURE 2 | SOG-e model

Source: Galliers and Sutherland [20].

4 | Rationale and methodology

Kenya's publishing industry has traditionally been reliant on print publishing; however, it is shifting towards e-publishing. This shift has been catalysed by the government's implementation of the Competency-Based Curriculum (CBC), which emphasises digital literacy and interactive learning, creating a demand for digital content that publishers have yet to fully meet [21-22]. Additionally, the industry, which is biased towards educational publishing, is facing competition from Edtech companies that are rapidly growing to take up the slack. Currently, there are 22 EdTech startups, with 12 focused on primary education and 10 on TVET [23]. Despite these catalytic pressures, the publishing industry in Kenya has been slow to adopt e-publishing. Janssen et al. [24] stated that disruptive technologies in any industry create complex technical, regulatory, and social challenges associated with their adoption. Ahuja et al. [25] identified the lack of an implementation framework as a barrier towards the adoption of information modelling technologies in India. Mittal et al. [26] found that the lack of an adoption framework hindered the adoption of smart manufacturing technology by small and medium enterprises. It is, therefore, probable that the low adoption of electronic publishing in Kenya has been due to the lack of a framework for adoption in the face of new technology. This lack can lead to delays in the adoption of innovation and, consequently, missed opportunities. Sulaiman and Mustafa [27] acknowledged that, although several studies have been conducted on the adoption of digital textbooks, there is a lack of in-depth, systematic investigations into the theories underlying this adoption. This study, therefore, aimed to investigate the factors influencing the adoption of e-publishing among publishers in Kenya and to propose an adoption framework for this purpose.

The study population was educational publishers in Kenya. The researcher used the publishers registered with the Kenya Publishers Association (KPA) as sampling frame for the research [28]. KPA had 43 registered members at the time of conducting this study. However, not all the registered members were publishers, and not all publishers registered were educational publishers. This therefore excluded 14 registered members from the study. The remaining 29 educational publishers formed the sample for the research. During data collection it emerged that 6 of the publishers included in the initial sample had gone out of business, through snowballing the 3 other publishing firms were added to the sample bringing the number to 26. Of these 15 agreed to particpate in the bring the response rate to 57.7%. The research employed a mixed-methods approach, using structured interviews to collect both quantitative and qualitative data from the respondents, who were CEOs/managing editors of participating publishing firms. The collected data was then coded quantitatively and analysed using IBM SPSS version 29 to provide both descriptive and inferential statistics. Qualitative data was analysed using and descriptive qualitative research methodology which focuses on data-near interpretation in which qualitative data is presented through direct quotes of respondents to provide un-embellished interpretation of the subject [29]. The study objectives were to investigate the extent of electronic publishing adoption among educational publishers in Kenya, identify the enabling factors for e-publishing adoption among the same, and develop an adoption framework for electronic publishing among educational publishers in Kenya.

5 | Findings of the study

The study involved 15 publishing firms that participated in the study. The demographic data of the firms and the respondents of the study is indicated in Table 1

TABLE 1 | Demographic data for publishing firms

Parameter	Option	Frequency	Percent
Year in which the publishing firm was established	Before 1999	3	20.0%
	2000-2005	3	20.0%
	2006-2010	0	0.00%
	2011-2015	5	33.3%
	2016-2020	4	26.7%
	Total	15	100.0%
Number of titles published by the publishing firms	Less than 100	6	40.0%
	101-200	3	20.0%

(Continued)

	201-300	3	20.0%
	more than 301	3	20.0%
	Total	15	100.0%
Indicated gender of respondents (CEOs/Managing Editors)	Female	3	20.0%
	Male	12	80.0%
	Total	15	100.0%
Indicated age of respondents	26-35	4	26.7%
	36-45	7	46.7%
	46-55	4	26.7%
	Total	15	100.0
Highest level of education of respondents	Diploma	1	6.7%
	Bachelors	7	46.7%
	Masters	6	40.0%
	PhD	1	6.7%
	Total	15	100.0%

5.1 | Extent of adoption of electronic publishing by educational publishers in Kenya

Findings from the study showed that the adoption of e-publishing among educational publishers in Kenya was low, with 7(46.7%) of the publishers in the study producing digital books. Only 4 (26%) of the publishers produced multimedia content for printed books, and only 2 (28.57%) of the publishers had multimedia embedded in their ebooks. See table 2.

TABLE 2 | Extent of adoption of e-publishing by educational publishers in Kenya

Question	Answer	Frequency	Percentage
Does your firm produce digital books?	Yes	7	46.70%
	No	8	53.30%
	Total	15	100%
Do you produce multimedia to accompany your printed books?	Yes	4	26.70%
	No	11	73.30%
	Total	15	100%

(Continued)

Question	Answer	Frequency	Percentage
Do your eBooks have embedded multimedia content?	Yes	2	28.57%
	No	5	71.42%
	Total	7	100%

5.2 | Factors enabling the adoption of electronic publishing by educational publishers in Kenya

The research investigated the factors that affect the adoption of e-publishing among educational publishers in the country, examining technology use, E-commerce, organisational establishment, organisational culture, funding, and strategy.

5.2.1 | Technology

This research investigated the use of technology in publishing firms, categorised into author and manuscript management, desktop publishing, distribution, customer relationship systems, automation for formal communication, and reliable Internet. The findings show that all publishers have digitised; however, only 2 (13.3%) have automated their systems and used author management systems. The majority, 13 (86.7%), used desktop publishing software, and 6 (40%) utilised automated inventory and distribution management systems. All the publishers had reliable and fast Internet. The study found no significant correlation between the use of these technologies and the adoption of e-publishing.

5.2.2 | E-commerce

The study investigated e-commerce elements used by publishers, finding that while all publishers had websites, only 9(60%) were e-commerce enabled. The publishers all utilised social media extensively for marketing, with Facebook, Twitter, and LinkedIn being the most popular platforms. Only 8 (53.30%) of the publishers promoted their firms online by buying ads, using influencers, and employing Search Engine Optimisation (SEO). The remaining 7 (56.70%) did nothing more than regularly update their social media platforms as a means of promoting their products. Further investigation revealed a moderately significant positive correlation (P value = 0.040) between publishers with a marketing strategy specifically tailored for eBooks and those analysing user data collected from their websites. This suggested that publishers with marketing strategies for online sales were more likely to invest in data mining and analysis than those that focused solely on the sales of printed books (see Table 3).

5.2.3 | Organisation establishment

A positive correlation was found between digital book production and the establishment year of the publishing firm (P-value = 0.036). The size of the publishing firm did not have any significant influence on the adoption of epublishing. There was, however, a negative

correlation between the number of titles published by the firm and the adoption of digital publishing (P = 0.038). See Table 4.

TABLE 3 | Correlation of marketing strategy and user data analysis

Question	Method	Do you have a marketing strategy specific to eBooks?	Was the user data collected and analysed at all
Do you have a marketing strategy specific to eBooks?	Pearson Correlation	1	0.598*
	Sig. (2-tailed)		0.040
	N	13	12
The data collected and analysed at all	Pearson Correlation	0.598*	1
	Sig. (2-tailed)	0.040	
	N	12	12

TABLE 4 | Correlation of production of digital book, year of establishment of firm and number of titles

Question	Method	Production of digital books	Year of establishment	Number of employees	Number of titles published
Production of digital books	Pearson Correlation	1	0.545*	-0.458	-0.540*
	Sig. (2-tailed)		.036	0.086	.038
	N	15	15	15	15
Year of establishment	Pearson Correlation	0.545*	1	-0.846**	-0.888**
	Sig. (2-tailed)	.036		<0.001	<0.001
	N	15	15	15	15
Number of employees	Pearson Correlation	-0.458	-0.846**	1	0.665**
	Sig. (2-tailed)	0.086	<0.001		0.007
	N	15	15	15	15
Number of titles published	Pearson Correlation	-0.540*	-0.888**	0.665**	1
	Sig. (2-tailed)	0.038	<0.001	0.007	
	N	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

5.2.4 | People

The findings revealed a significant correlation (P-value=0.040) between the adoption of digital publishing by publishing firms and the gender of their staff. The outcomes suggested that one gender is more pronounced in the production of digital books. Further investigations revealed that of the seven (7) firms that had produced digital books, three (3) of them had female respondents; they were also the only three (3) females among the respondents. There was also no correlation between age and the production of digital books. There was no correlation between the age and level of education of managers and the adoption of digital publishing by the publishing firm. See Table 5.

TABLE 5 | Correlation of production of digital books, age, gender and level of education of publishers

Question	Method	Production of digital books	Gender	Age	Level of Education
Production of digital books	Pearson Correlation	1	0.535*	0.000	-0.136
	Sig. (2-tailed)		0.040	1.000	0.628
	N	15	15	15	15
Gender	Pearson Correlation	0.535*	1	0.228	-0.139
	Sig. (2-tailed)	0.040		0.413	0.621
	N	15	15	15	15
Age	Pearson Correlation	0.000	0.228	1	0.381
	Sig. (2-tailed)	1.000	0.413		0.161
	N	15	15	15	15
Level of Education	Pearson Correlation	-0.136	-0.139	0.381	1
	Sig. (2-tailed)	0.628	0.621	0.161	
	N	15	15	15	15

*. Correlation is significant at the 0.05 level (2-tailed).

The researchers also investigated the staffing function at other levels of the organisation, including their competency and availability. The publishers had two main categories of employees: technical, support, and administrative staff. Technical employees included editors, designers, printers, salespeople and marketers. Most publishers (9, 60%) required editors to have a bachelor's degree, while 2 (13.3%) did not, as long as they demonstrated relevant skills. Designers required a minimum diploma (8, 53.30%), but 3 (20.0%) relied on portfolios and did not require formal qualifications. Two firms fully outsourced design and layout, so they did not set qualifications. Most publishers (8, 48.7%) did not have marketing departments, relying on distributors they therefore, they had no minimum qualifications for marketing personnel. Of the remaining seven, 3 (20%) required a diploma for

marketers. Three firms had printing presses operated by their staff. Two (13.3%) did not require minimum qualifications for machine operators and were recruited based on ability. The third firm required a diploma for a plant operator.

The majority of publishing firms (8, 53%) required a bachelor's degree for management positions, while a diploma was preferred for support staff. One firm lacked support staff and did not have data on its requirements. Publishers expressed concerns about skill shortage in terms of skills for electronic publishing, as indicated by the quotations below.

"We have not been into it [digital publishing] for so long. I can say we have not made much progress in digital publishing because we do not have people who will support us; we lack employees who can support the process". （From Firm D）

"At the moment, we need more experience in digital marketing and audio production". (From Firm G)

5.2.5 | Funding

The majority of publishers, except for 2(13.3%), experienced financial growth and were able to meet their financial obligations. Most publishers, 11 (73.33%), relied on sales revenue for funding, while a smaller percentage, 4 (26.67%), utilised loans. Printing was the largest expense for most publishers, 5(33.33%) followed by book production 4(26.66%), payroll 3(13.33%), and marketing 3(13.33%). A significant positive correlation exists between the allocation of funding for electronic publishing and the production of eBooks ($P < 0.002$). There was, however, no significant correlation between the adoption of electronic publishing and firm expenses, financial growth, and sources of funding.

5.2.6 | Organisational culture

The study's findings showed that 12 (80.0%) of the publishers encouraged risk-taking, while the remaining 3 (20.0%) indicated that they encouraged risk-taking with caution. The findings also showed that publishers (53.3%) had flexible working hours for their employees, while the remaining 7 (46.7%) had fixed working hours for all their employees. An inquiry into the autonomy of employees revealed that 6 (40.0%) of the firms gave their employees complete autonomy to undertake their roles. The majority (8, 53.3%) of the publishers, however, indicated that their employees were semi-autonomous, while 1 (6.7%) said that their employees had no autonomy. All the firms mentioned that they had created a conducive working environment, including organising team building sessions as well as family events for their employees at least once a year. The publishers were asked if they considered their firms to be task-oriented or people-oriented. The majority, 77 (46.7%), said that they were people-oriented, while 3 (20.0%) said they were task-oriented. Five (33.3%) of them said that they were more task-oriented than people-oriented. In terms of decision-making, the majority (12, 80.0%) of the firms stated that top management had the final say on the decisions made within the firm. The remaining 3 (20.0%) stated that the decisions were made collectively by the managers and employees. The study found no significant correlation between the adoption of digital publishing, risk-taking, employee autonomy, job flexibility, and firm orientation.

5.3 | Model for adoption of e-publishing

The research set out to develop a framework to guide the adoption of electronic publishing by educational publishers in Kenya. To achieve this, the researchers collected data through the conducted literature review and the conceptual framework of this study, identifying independent and dependent variables for the research. The independent variables included technology (technology use and e-commerce), Organisation (organisational structure, funding, strategy), and Environment (organisational culture and macro environmental factors). The researchers, therefore, conducted a ridge regression of the independent variables to determine the extent to which they contributed to the dependent variables.

The model summary in Tables 6-7 indicates that the independent variables had a training R-squared value of 0.991, suggesting that they collectively contributed up to 99.1% of the variance in the dependent variable. However, the model had a holdout R-squared of 0.00, which indicated that while the model was a good fit, it was not generalisable as it would not be able to handle new, unforeseen data. This was likely due to the small size of the training data set.

TABLE 6 | Regression model of independent and dependent variables[a,b]

Alpha	Training R Square	Holdout R Square
1.000	0.991	0.000

Note: a. Dependent Variable: Adoption of digital publishing; b. Model: E-commerce, Organisation, Strategy, Culture, Finance, Technology listed in Table 7.

TABLE 7 | Ridge Regression Coefficients[a]

Alpha	Model	Standardising Values[c]		Standardised Coefficients	Unstandardised Coefficients
		Mean	Std. Dev.		
1.0	Intercept[b]	.	.	1.250	-0.951
	E-commerce	1.250	0.000	0.000	0.000
	Organisation structure	1.500	0.306	0.069	0.224
	Strategy	1.625	0.545	0.038	0.070
	Culture	1.800	0.245	0.073	0.298
	Finance	1.333	0.333	0.022	0.067
	Technology	1.300	0.100	0.087	0.867

Note: a. Dependent Variable: Adoption of digital publishing; b. The intercept is not penalised during estimation.; c. Values used to standardise predictors for estimation. The dependent variable is not standardised.

The coefficients of the independent variables indicated that e-commerce had no effect on the adoption of digital publishing, and organisational structure had a slight positive (0.069) effect on the adoption of digital publishing. The use of technology (0.087) had the most significant effect on the adoption of digital publishing, followed by organisation culture (0.073). Strategy (0.038) and finance (0.022) had a small positive effect on the dependent variable.

From the regression model in Table 6, it was clear that aside from e-commerce, all other variables contributed towards the adoption of digital publishing among educational publishers. The researchers therefore used the variables to create a maturity model (see Figure 3). The proposed EPAMM had four levels. These were initial, basic, established, and innovative, with the initial level being the lowest level of maturity and innovative being the highest level of adoption. At each stage, there were six key elements to consider. The level of technology used, the level of personnel in the firm, e-commerce adoptions, organisational structures, strategy for publishing, and organisational culture. The model described the main feature of each of these key elements at each level of the maturity model. For example, at the initial level, the level of technology used by publishers was minimal, and the publisher did not produce digital books; however, at the established level, there was the adoption of cutting-edge technology in the production of Interactive Digital Content.

FIGURE 3 | Electronic Publishing Adoption Maturity Model

To enable publishers to use the model effectively, the researchers developed a self-assessment tool in the form of a self-administered survey (see Table 8).

Publishers can use the assessment tool to determine the level of maturity their firms have achieved by responding to the questions. Each question is linked to an element of the model, and a score is given for each answer corresponding to the level of maturity on the model. The score awarded to each element was based on the contribution of the element towards the adoption of electronic publishing; therefore, the technology question has the highest score across maturity levels, while e-commerce has the least. See Table 9.

TABLE 8 | Electronic Publishing Maturity Model Assessment Tool

Question	Option	SCORE
Which of this best describes the use of technology in your organisation?	Basic technologies mandatory for book production	10
	Intermediate - some departments have high levels of automation while others are still manual	20
	Interconnected - all departments and sections have specialised technologies integrated workflows	30
	Cutting edge - exploring new technologies producing interactive content	40

(Continued)

Question	Option	SCORE
How do you rate the skill of your personnel when it comes to production of digital books?	Poor, no skills in the area	5
	Intermediate - mostly individual effort to learn publishing process	10
	Experts - well trained highly skilled labour digital publishing	15
	Leaders - experts able to transfer skills to others in the company	20
Which of this best describes the approach that you company has taken in e-commerce?	No participation, we do not undertake e-commerce	5
	Interactive - we have an e-commerce enabled website and use social media to market and sell book	10
	Integrated - our sales and online marketing are highly integrated	20
	Leveraged - we make full use of user data collection and data analytics to enhance production and customer satisfaction	30
Which of these bests describes the e-publishing organisation structure adopted by your firm?	None - No specialised structures of digital publishing	24
	Technology bias - e-publishing is a part of the ICT department	48
	Established - a separate department for e-publishing with earmarked resources	72
	Transformative - a dedicated department for e-publishing with significant funding and research and development focus	96
Which of this best describes the strategy your firm is applying toward digital publishing?	No strategy - we are yet to consider it	5
	Detailed plan for production and market penetration with funding allocated to the process of start up	10
	Adaptive plan for market development and retention with evaluation of return on investment in digital publishing	15
	Predictive plan for e-market expansion guided by market research and data analytics, intensive investment in future expansion of digital publishing to achieve self-sustaining model	20
Which statement best describes your firm?	Traditional - long established and high held values tradition	6
	Family - we move as fast as our slowest member	12
	Competitive - we hold our own in the industry	18
	Trail blazer - we forge ahead and take risks	24

TABLE 9 | Score matrix for EPAMM

Level of maturity	Tech-nology	People	E-commerce	Organi-sation	Strategy and funding	Culture
Initial	30	5	5	24	5	6
Basic	60	10	10	48	10	12
Established	90	15	20	72	15	18
Innovative	120	20	30	96	12	24

To use the assessment tool, a publisher responds to six questions by choosing the option that best fits the description of the firm. Each response was assigned a score. The score is summed at the end. The total highest score is 310, while the lowest possible score is 77. The publisher used the total score to gauge the general level at which they fall on the maturity model. In contrast, specific scores for each section indicated the maturity level on each key element. For example, a publisher could score a total of 215, which indicated that they were at the established level. The publisher could then review the individual scores in each key element (Technology: 90, People: 10, E-commerce: 10, Organisation: 72, Strategy and Funding: 15, and Culture: 18) to identify which key areas needed improvement. In the case of the given example, the publisher needed to improve in people and e-commerce. Table 10 shows the corresponding scores for each level of maturity.

TABLE 10 | Scores for Levels of Maturity in the EPAMM

Level of maturity	**Score**
Initial	0-77
Basic	78-154
Established	155-236
Innovative	237-310

6 | Discussion of findings

The study's findings showed that only 46.7% of educational publishers in Kenya have ventured into electronic publishing. This is a lower level of adoption in South Africa at 92% [30], but higher than in Nigeria at 30.2% [31] and Ghana at 14.2% [32]. It is clear, therefore, that the adoption of electronic publishing is not uniform across the African continent. Hooks et al. [33] analysed factors that affect the adoption of technology among different countries (15 countries), based on the Technology Organisation Environment theory. They confirmed that a country with high competitiveness, a high level of cybersecurity, low levels of political violence, and low levels of terrorism tends to adopt digital technologies more readily

than others. The World Economic Forum rates South Africa the country with the highest competitive index (62.4), followed by Morocco (60), Egypt (54.5), Kenya (54.1), Ghana (51.2), and Chad being the country with the lowest competitive index (35.1) (World Economic Forum, 2019). Considering cybersecurity, the top five countries in Africa were Morocco (70.0%), Tunisia (65.83%), Ghana (63.33%), Nigeria (58.33%), and Egypt (50.83%). Kenya is not among the top 50 countries in national cybersecurity [34]. It was clear, therefore, that the Macro-environment had an impact on the adoption of technology. Kenya had a relatively high level of competitiveness, but low levels of cybersecurity and a weak political stability index (-0.94), which can impact the country's level of adoption of new technologies.

There was no significant correlation between technology use and the adoption of electronic publishing. This finding contrasts with the research by Ifeduba and Christopher[16], which revealed a significant correlation (P-value of 0.049) between hardware technology and the adoption of digital publishing by publishers in Nigeria. When regressed, the findings showed that technology had the highest contribution (0.087) to the adoption of digital publishing. This indicates that the adoption of e-publishing is not reliant on a single technology, but rather a combination of different technologies, including both hardware and software.

Kenyan publishers participated in e-commerce even if they did not produce digital materials. Kenya is currently ranked third on the African continent with an e-commerce penetration rate of 46.7%, after Egypt (55.4%) and South Africa (49.4%) [35]. This adoption can be attributed to the emergence of mobile payment gateways, which have made online payments convenient for consumers who previously required a bank account and a credit/debit card. [36]

Facebook was the most widely used social media platform by Kenyan publishers. This aligns with results from other studies [37,38], acknowledging Facebook's popularity Kenya. However, aside from having a presence on social media, only 53.3% of the publishers engaged in online promotional activities. This finding contradicted that of Ifeduba[39], who reported that 87% of publishers in Nigeria engaged in online promotions. This showed that, unlike Nigerian publishers, Kenyan publishers had yet to exploit cyberspace for the promotion of their publications fully. Adamu et al.[40] found, in their study on the effect of social media marketing on retail businesses in Nigeria, that passive social media presence did not have a significant impact on sales, whereas active online marketing had a significant positive relationship with online retail performance (P-value, 0.006). It is, therefore, necessary for Kenyan publishers to put more effort into online marketing to reap the benefits of e-commerce.

The findings showed that there was low data mining of consumer information by publishers in Kenya. Consequently, publishers miss out on gains such as useful insights from analysing user data that help better identify and segment their E-commerce customers [41], as well as model or predict consumer behaviour [42]. User data is therefore a resource that is being underutilised by publishers in Kenya. The study revealed a significant correlation (P-value = 0.040) between the analysis of user data and the presence of a marketing strategy for eBooks. The existence of a marketing strategy for eBooks by publishers posits an intentional promotion of digital publications by the firm. This, in turn, raises awareness of the eBooks among customers. This finding aligns with those of Ifeduba [39], who reported a significant positive correlation (P-value = 0.002) between online promotion and perceived consumer readiness for digital publications. Furthermore, Ifeduba stated that the higher the readiness of consumers for digital publications, the higher the likelihood of publishers adopting digital publishing.

This study revealed a positive correlation between the adoption of digital publishing and the year of establishment of the firm (P-value = 0.036). This suggests that the age of a firm may influence its adoption of digital publishing. This study identified other studies that had found the age of the organisation to be a significant factor in the adoption of technology [43-45]. There are, however, several studies that have shown contradictory results, indicating that the age of an organisation has no significant impact on the adoption of technology by the firm [46,47]. The researcher posits that older publishing firms have more experience in the industry as well as the financial stability to adopt new technologies more easily than newly established firms. The research findings also showed that there was no significant correlation between the sizes of the firms and the adoption of digital findings. Several studies have shown that the size of an organisation has an impact on its adoption of technology [43,48].

The study found a correlation between the gender (P-value = 0.04) of managers at the publishing firms and the adoption of digital publishing. This indicated that the gender of the firm's managers had a significant impact on the adoption of digital publishing by the firm. The majority (80%) of the managers at the publishing firms were male. However, all three (3) firms whose managers were female had adopted digital publishing. Contrary to the findings of this study, a survey of the South African publishing industry revealed that women comprised 71.9% of upper management in publishing firms[49]. Given the high level of digital publishing adoption in South Africa, this seemed to lend credibility to the notion that firms were more likely to adopt digital technology if they had women in senior management positions. A study by Post et al. [50] provided a plausible explanation, finding that when women were included in top management teams in organisations, there were cognitive shifts in the firms that led to more change-oriented and less risk-seeking behaviour. This led to a reduction in mergers and acquisitions, accompanied by increased investment in research and development, and a greater emphasis on building rather than acquiring. Additionally, Ferrary and Déo [51] found that firms with a balanced diversity of female employees, ranging from 40% to 60% in upper and middle-level management, tended to be more profitable.

Aside from gender, the study found no correlation between the age of the managers and the adoption of digital publishing. This supported findings by Okrah and Irene [52], who found that the age of the managers in organisations did not affect innovation, but rather the length of experience in the position contributed positively to innovation. This study also found that there was no significant correlation between the level of education of publishing managers and the adoption of digital publishing. This supports the findings of Yuen et al. [53], who found that neither the level of education nor the age of respondents had a significant correlation with the adoption of new technologies, such as autonomous vehicles.

To successfully adopt new technologies, publishing firms must have qualified employees. This study found that publishers were facing challenges in finding personnel, specifically, employees with skills in marketing digital publications, animations, and creating interactive digital content. Elongué [54] states that a skill gap exists in digital publishing in Africa, particularly in editing, marketing, and platform development. Ifeduba [39] suggested that there should be collaborations among publishers and other relevant associations, such as online booksellers, and content creators, among others, to provide hands-on guidance on the modalities of digital publishing to assist those publishers interested in engaging in digital publishing but lacking skills to take a step towards the same. The findings also showed that publishers' recruitment qualifications for technical employees were biased towards skill-based rather than educational qualifications. This is supported by the findings of Ehlinger and Stephany [55], who stated that for new skills in AI and green jobs, employers preferred to hire employees based on their demonstration of competency of the required expertise rather than their academic qualifications.

The adoption of digital publishing incurs a financial cost for the most part, publishing in Kenya generates sufficient revenue for business sustainability. Elongué [54] stated that funding is a significant challenge for aspiring digital publishers in Africa. It was clear that the adoption of new technologies came with added costs for investments. Therefore, a lack of sufficient funding may be a barrier to the adoption [56]. Additionally, the findings revealed that printing costs were a major expense for the majority of publishers. Longhorn Publishers declared a net loss of 163 million in 2023. They cited a 70% increase in printing costs over the past year due to currency depreciation[57]. Publishers in Kenya rely on paper importation to print books. Thus, an increase in taxation on imported paper has increased the production cost of books [58]. Done et al.[59] noted that not only is printing expensive, but it is also an eco-unfriendly production process that contributes to environmental degradation.

Print-on-demand is a technology that publishers can adopt to reduce printing costs. Print-on-demand reduces the need for warehousing by enabling publishers to print on order, rather than running print runs for economies of scale [60], thereby reducing production overhead costs. Alternatively, the adoption of digital publishing eliminates the costs associated with warehouse and production of printed books; however, it does incur costs, as publishers must handle the expenses of setting up databases, managing servers, and managing user subscribers[61]. Therefore, even though digital publishing requires a high initial investment, it reduces overhead costs by eliminating the need for printing, warehousing, and distribution expenses [60][62]. It is possible, therefore, that publishers in Kenya should adopt digital technology as a strategy to reduce production costs.

Organisational culture is an important aspect of adopting new technology. Williams et al. [63] state that entrepreneurship is inherent with risk-taking and uncertainty. Therefore, persons undertaking it must be willing to take risks to remain relevant. Widianingsih et al. [64] posited that while risk-taking is necessary, it should be backed up by research and development to ensure long-term success. A relationship existed between risk-taking and innovation within the firm. García-Granero et al. [65] showed that not only does managerial risk-taking enhance innovation performance, but it also creates a risk-taking climate within the organisation, leading to a higher likelihood of innovation. The study's findings showed that publishers made efforts to provide employees with a good working environment by offering flexible working hours, high autonomy, and motivation. The publishers strive to achieve employee job satisfaction by providing employees with benefits such as bonuses, team-building activities, family days, adequate leave days, and fair remuneration. Demircioglu [66] and Gambardella et al. [67] argue that employee satisfaction has a positive influence on innovation within the firm. This means that the more satisfied employees are with their jobs, the more likely they are to be innovative and adapt to innovations more effectively.

The findings of this study also showed that the majority (45.7%) of the publishers were more task-oriented than people-oriented. This, in turn, meant that they prioritise a focus on goals, outcomes, and productivity rather than employee engagement. De Castro and Meneses[68] demonstrated that an adhocracy culture, characterised by high levels of employee autonomy, a reduced focus on official authority, and high levels of dynamism, is more suitable for the adoption of new technologies. Conversely, hierarchical and clan-based cultures do not show positive effects on the adoption of innovations. From the findings, it was clear that most publishers leaned more towards market/commercial organisational cultures than adhocracy, which means they are less flexible and less likely to adopt new technologies unless they see clear economic benefits from them.

Bendak et al.[69] posited that not all organisations have a single organisational culture and that, depending on the area they want to innovate in (product, process, organisational, or marketing), they need to emphasise different organisational cultures to achieve it. For example, to foster innovation in production, they need to have a 45% clan culture, a 13% adhocracy culture, a 19% marketing culture, and a 23% hierarchical culture. It is evident from the literature that organisational culture plays a role and can influence how publishing firms can adapt to digital publishing.

The adoption of digital publishing by publishers in Kenya is not a linear process. This is because the components for the adoption of digital publishing are varied and cross-cutting in the organisation. Some of these components may already be available to some publishers, but they may not be aware of or have the capacity for them. Consequently, publishers will adopt new technologies in a manner unique to each of their contexts. Most of the time, it occurs in an ad-hoc manner, with different components of the innovation being adopted at various stages and in varying ways. Wagire et al. [70] and Senna et al. [71] faced a similar challenge when evaluating the adoption of Industry 4.0 technology in organisations. They concluded that a framework is needed to guide the adoption of digital publishing among publishers.

Gaigher et al. [72] in their study on the effect of digital publishing on traditional publishing in South Africa, developed a list of objectives to guide publishers as they adopted the technology. Among the objectives were for publishers to create autonomous divisions

dedicated to digital publishing, adopt an informal management style, reserve key resources, prepare for organisational change, analyse consumer behaviour, exploit the unique attributes of e-publishing technology, engage in open innovation, and adopt an international perspective. These objectives, while useful, are mainly applicable to publishers who are starting and beginning to adopt digital publishing; however, for those who have already adopted, the objectives provide no way of gauging the success of the adoption or evaluating areas in which they may be lacking.

This research, therefore, proposes the use of a maturity model to guide the planning, design, and implementation of new technology in organisations, acting as a roadmap for adoption. This research proposed the Electronic Publishing Adoption Maturity Model (EPAMM). Lasrado et al. [73] conducted a literature review on the development of maturity models. They found that while maturity models help map the adoption of technology in organisations, it is essential that the models are developed through pragmatic methods, informed by empirical research [74]. Proença and Borbinha [75] also opined that maturity models provide a path towards organised systematic adoption of technology. They further added that maturity models are valuable tools for stakeholders to easily assess aspects of the organisation, identify areas of weakness and prioritise improvements to gain higher maturity levels. Despite the benefits of ease of use and interpretation, maturity models are not without their challenges.

Akinpelu et al. [76] investigated the challenges of maturity models. They found that the use of different maturity models produced varying results within the same organisation, while others were complicated and required specialised skills to implement and utilise. Fenton [77] stated that maturity models oversimplify complex processes, which can lead organisations to underestimate the requirements of implementation. He further stated that 'best' is contextual. While maturity models assign levels to goals to work towards, some organisations may be better served by not achieving all the set milestones, especially in instances where progress is not linear. Williams et al. [78] added that not all maturity models have been validated; thus, their applicability is questionable.

7 | Conclusion and recommendations

The study established that to adopt e-publishing, publishers need to have access to technology, adequate skills, funding and an organisational culture and structure that supports innovation. The findings showed that all publishers in the study possessed the basic technologies necessary to produce books, including desktop publishing software, a reliable Internet connection, and inventory distribution systems, among others. However, the e-publishing functions were often digitised but not automated. Additionally, the adoption of technology was mostly insular to departments rather than organisation-wide. The unavailability of skilled personnel was a barrier to the adoption of e-publishing. Publishers reported challenges in finding employees who could undertake digital publishing, particularly with interactive digital materials that required audio and audio-visual formats or the use of animations. Funding was a necessity for the production of eBooks, as firms that ring-fenced funds for digital publishing were able to achieve better results. The publishing firms mainly displayed a market-oriented organisational culture. However, there was no significant correlation between organisational culture and the adoption of digital publishing. In conclusion, the study found that while technology makes a significant contribution to the adoption of digital publishing, other key resources, such as skilled personnel, adequate funding, supportive organisational structures, and an organisational culture that encourages innovation, are also important for the successful adoption of e-publishing.

The study therefore recommends:

1. Publishers who are adopting digital publishing need to upskill or recruit qualified personnel who will not only produce high-quality digital publications but also shore up the challenges they are facing with marketing of digital publications, thus creating more awareness of the availability of eBooks and consequently generating more revenue.

2. Publishers should strive to create an organisational culture that is open to innovation.

3. Publishers should adopt the EPAMM to help them assess their level of digital publishing adoption, both for those who have already adopted it and for those who wish to venture into digital publishing, providing a starting point for their journey.

8 | Limitations of the study

The main limitation of the study is its limited sample size which was occasioned by a small population as well as difficulty accessing the respondents as nearly half declined participation. While this limits its generalizability the study explored in-depth detailed perspectives of participants experiences that would have been difficult to do with a larger population.

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