



E-business adoption costs and strategies for retail micro businesses

Marcia Mkansi¹

Accepted: 6 November 2020 / Published online: 19 January 2021
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Abstract

E-business benefit both large and small businesses. However, the aggregate cost of successful online trading, including initial and recurring costs, continues to pose a great challenge to micro-enterprises. For these willing businesses, the result is a mere web presence and for some, the thought of trading online is a no-go area. Using a multi-case study qualitative approach, this study adopts the technology-organisation-environment theoretical lens to explore empirically the strategies used by e-retail microbusinesses to potentially advance their e-business adoption. The findings revealed the actual cost of adoption, the technology-organisation-environment strategies in use to lower the cost barrier, and how the pursuit of the cost barrier simultaneously lowers some adoption barriers outside the cost factors. The study also highlighted the intrinsic idiosyncratic nature of small firms' ecosystems, and the fact that government resources and services provided by companies, both private and public, could effectively reduce the costs associated with e-business adoption.

Keywords E-business adoption · Retail · Microbusiness · Technology-Organisation-Environment Theory

1 Introduction

The growing significance of electronic commerce is reflected in global e-retail revenue that has increased from US\$1,115.7 billion in 2016 to \$3.5 trillion in 2019 [1, 2]. The exponential growth of e-commerce is fuelled by the widespread use of the Internet and the rising prevalence of mobile devices that has not only increased the number of internet users, but has also created alternative trading channels across industries, including but not limited to grocery, apparel and books. One of the most popular online categories worldwide is apparel, attracting 57% of global internet users [1, 2]. That notwithstanding, the aggregate number of small and medium

✉ Marcia Mkansi
marcia.mkansi@gmail.com

¹ Department of Operations Management, University of South Africa, Pretoria, South Africa

enterprises (SMEs) globally that have adopted e-business remains low in comparison to large organisations [3–5]. The majority of SMEs with high adoption of e-business appear more in developed countries [6–8], than in developing countries [9, 10]. Those small firms in developing countries are beyond the minimum levels of e-business adoption [5, 11]. For example, African businesses constitute only 2% of enterprises in e-commerce [11], and these African businesses are under-researched [12, 13].

Scholars that have studied the underlying issues behind SMEs' low e-business adoption have revealed that microbusinesses experience the high costs of successfully integrating external and internal business processes in e-business as barriers [14–16]. In the light of these findings, the major challenge for microbusinesses that wish to operate in this e-environment is determining how to make their overall e-business strategy less risky, while incurring the minimum costs possible. Microbusinesses find it more difficult to embark on e-business than larger firms do [3, 5], because of direct costs, such as personal computers (PC), Internet connectivity, access to telecommunications, and network facilities [11, 13, 16]. Also identified are complementary costs related to dealing with legal issues, maintenance and upgrades [13, 16], delivery and payment security costs [17], a lack of time [18], information [19, 20], knowledge and qualified staff [13, 14, 21]. From the literature, a gap was also identified in the form of a lack of awareness of information, such as government support [22–24]. Yet, identifying the nature of government support and raising awareness is crucial for developing small firms and to facilitates knowledge of how it influence e-business adoption.

In an effort to gain a deeper understanding of e-business adoption, several studies used technology-organisation-environment (TOE) as a theoretical framework to explore how the three constructs of technology, organisation and environment influence e-business adoption and implementation [23, 25–27]. A systematic review of the TOE research from 2008 to 2017 reveals theoretical conclusions that focus mainly on how the technology, organisation, and environment influence the adoption and implementation of various aspects of innovation [25, 27], rather than specific references to how SMEs can lower the cost barrier by focusing on TOE strategies in the use and actual costs of e-business adoption.

Moreover, TOE uses taxonomies to categorise factors into contexts, which neglects specific information that relates to the social context of individual small firms [28, 29]. Put simply, there are few studies, if any, that have used the TOE approach to gain an understanding of small firms' adoption strategies pertaining to contexts, and informing e-business adoption from evidence generated in other small firms, rather than from the perspective of big organisations. It is in the face of the lack of current studies that empathise with the financial constraints of microbusinesses that the proposed study becomes not only relevant but also imperative. Hence, the aim of this study is to use TOE as a lens for exploring (1) the actual cost of, and (2) e-business adoption strategies in use by microbusinesses, and (3) to identify associated public and private resources and their effects on e-business adoption strategy. The proposed twist of using TOE to explore the e-business adoption strategies in use, and the actual cost of SMEs' e-business adoption is relevant in today's business environment because:

- (a) e-commerce and the Internet have become a common business platform and marketplace for many customers [11, 30];
- (b) the number of microbusinesses transacting in e-business is low compared to larger organisations [3, 5]; and
- (c) small firms are idiosyncratic (or peculiar in terms of social context, resources, etc.) in nature, and could benefit from research evidence of other small firms in similar contexts, rather than from large organisations [31]. Furthermore, small firms' decisions on choice and implementation differ from their larger counterparts [32, 33].
- (d) TOE uses taxonomies to categorise factors into contexts, which neglects specific information that relates to the social context of individual small firms [28, 29].

The next section presents an overview of the e-business adoption research, cost barriers and theoretical perspectives (TOE) that have influenced the search for alternative empirical evidence of the e-business adoption by microbusinesses. Thereafter, the theoretical background, the methodology, findings, discussions and conclusions are presented.

2 Literature review

A microbusiness is defined as any business with fewer than nine employees [34]. The current study adopted this definition for a microbusiness. Various scholars commonly describe an e-business as an umbrella term used to describe the all-encompassing concept of enabling the exchange of business information and automation of commercial transactions over the Internet [3, 6].

The literature provides ample evidence of the research that has been done on the e-business adoption issues related to small firms over the past decade [4, 10, 35], both from the perspective of developed economies [6, 8] and developing economies [9, 10, 36]. From the great insight offered by the latter studies, however, not much, if anything, has been done relating to the minimisation of cost barriers in terms of e-business adoption by small firms. Most previous studies focused on understanding the barriers or obstacles to e-business adoption [6, 9, 10], determinants of website adoption [37], patterns of e-business adoption [38], e-commerce technology adoption [12, 36], and perception of barriers to e-commerce adoption [8]. The exceptions are Kapurubandara's [39] framework towards the e-transformation of SMEs in developing countries, and Shi et al.'s [4] examination of the gulf between the online and offline operating costs for SMEs. However, Kapurubandara offers no solution to cost barriers, but rather provides a good roadmap of the barriers that may be encountered at the different stages of e-business adoption. For their part, Shi et al. [4] provide an indication of the timing that could assist SMEs in e-business adoption, but their emphasis is on operating costs, and not on the costs and strategies of e-business adoption in small firms. According to Zaide [10] and Wanyoike and Mukulu [36], cost barriers continue to inhibit small firms and need to be addressed. At the time of the current

research, there was no evidence of research that explored how current successful small firms managed to lower the cost barriers, and that provided an understanding of the strategies in use.

A narrow review of studies that used TOE to understand e-business adoption from the years 2008 to 2017 also reveals the lack of research specifically focusing on the lowering of direct and complementary cost barriers for small firms, and scholars are less certain of the actual costs incurred per context. For example, Haneem et al.'s [25] systematic literature review of 22 studies that used the technological, organisational, individual, and environmental (TOIE) context between the years 2013 and 2017 mainly revealed the critical determinants that influence IT innovation adoption. Maduku et al. [27] also presented research conducted between 2008 and 2013 that used TOE to understand e-business, and revealed the various factors that influence implementation and adoption across contexts. Although the findings of Haneem et al. [25] and Maduku et al. [27] are significant in enabling an understanding of e-business adoption research from TOE contexts, it reinforces, however, the literature survey results obtained by Oliveira and Martins [38] that point to the same neglect in terms of using TOE to understand the strategies in use and the actual cost of adoption.

Fillis et al. [40] suggest that there is little or no consideration of the growth of small firms in the e-business marketplace and their particular needs and wants in this sector. This is especially so in developing countries, where SMEs are constrained by a lack of telecommunication infrastructure, qualified staff to develop e-business, limited consumer skills in internet usage [11, 13, 16], lack of timely supply and distribution systems for delivery of goods [17], low income, low credit card penetration, and low internet and computer penetration [10, 12, 16, 39]. Yet, SMEs are considered to be the engines of economic growth and employment for many countries [6, 41], accounting for 80% of global economic growth [42], while they make a 90% contribution to the African continent [10].

The costs of e-business adoption identified by the Organisation for Economic Co-operation and Development (OECD) [34] and other scholars [11, 13, 16] (see Table 1) include the direct costs of ICT equipment, network facilities, software and re-organisation, and electronic data interchange (EDI); and the complementary costs, including hiring qualified personnel (with managerial knowledge), dealing with legal issues, ongoing costs of maintenance and upgrade, as well as delivery costs.

In their study of the determinants of social network adoption, Wanyoike and Mukulu [36] also found that high cost was considered an inhibitor, but with no details of the specific cost elements. International Trade Center (ITC) [11], similarly, identified the high costs of connectivity, access to telecommunications, and equipment or tools. Lawrence and Tar [16] pointed towards the cost of PCs, internet access, and human capital for installing, operating, training and support, as well as maintenance. Olaitan et al. [23] and Ismail et al. [76] echo the high connectivity costs as the biggest problem faced by South African SMEs towards e-business adoption (see Table 1).

The next section presents the theoretical lens for this study.

Table 1 E-business adoption cost barriers

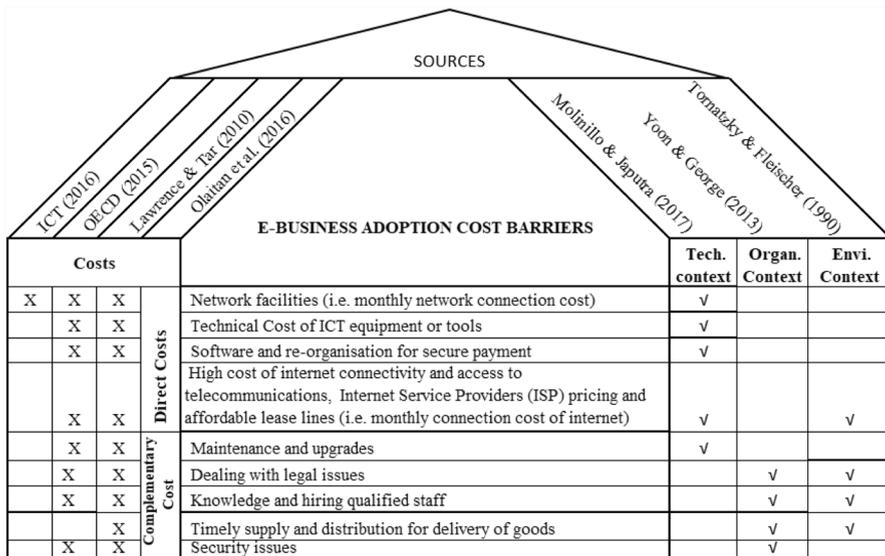
E-Business adoption cost barriers	Sources				
	ICT [11], Olaitan et al. [23]	Ongori and Migiro [13]	OECD [34]	Lawrence and Tar [16]	Hove and Karimov [17]
<i>Direct Costs</i>					
Network facilities (i.e. monthly network connection cost)	✓	✓	✓	✓	
Technical Cost of ICT equipment or tools		✓		✓	
Software and re-organisation for secure payment		✓		✓	✓
High cost of internet connectivity and access to telecommunications, Internet Service Providers (ISP) pricing and affordable lease lines (i.e. monthly connection cost of internet)				✓	
<i>Complementary Cost</i>					
Maintenance and upgrades			✓		
Dealing with legal issues		✓		✓	
Knowledge and hiring qualified staff		✓		✓	
Timely supply and distribution for delivery of goods				✓	✓
Security issues			✓	✓	✓

3 Technology-organisation-environment theoretical framework

The various e-business adoption theories commonly used at the organisational level are the resource-based theory (RBT), Roger’s diffusion of innovation theory (DOI), and the technology-organisation-environment (TOE) framework [22, 35]. However, the latter theories are criticised for a lack of conclusiveness and suitability for SMEs’ e-business adoption decisions. For example, the inability of RBT to explain the effects of external factors on the adoption decision of non-entrepreneurial firms is considered a weakness [43, 44]. The inadequacy of DOIs to explain the dynamics of multiple social systems of small firms [35, 37], and exclusion of environmental and organisational context [25, 27] is also considered a weakness. Although some scholars applied the TOE theory [45, 46], the theory is also criticised for using taxonomies to categorise factors into contexts, which neglect the specific information that relates to the social context of individual small firms [28, 29].

Put simply, although there are a variety of theoretical frameworks of e-business adoption available to SMEs, they have limited explanatory powers. In particular, in relation to the idiosyncratic nature of SMEs that is characterised by complex networks and the interplay of varying interpersonal relationships, trust and dependency of family [35], and the small and medium businesses’ environment, which is usually subject to limited time, information, knowledge [13, 14, 21], and financial resources.

Whilst the above-mentioned e-business adoption theories have inherent explanatory weaknesses in terms of small firms’ decisions, this study considers TOE as an exceptional and suitable lens to adopt and advance. This is mainly because TOE’s theoretical constructs or the three elements of a firm’s context, namely technology,



Notes: X= mapping for cost sources, √ = mapping of TOE sources

Fig. 1 Mapping of cost barriers to TOE theoretical framework

organisation, and environment, embody key risk areas where direct and complementary costs emerge (see mapping in Fig. 1). Furthermore, TOE has been affirmed as a solid theoretical lens with better explanatory power in the study of e-business adoption at firm level [23, 26]. In addition, TOE posits that technology (internal and external infrastructure), organisation (scope, size, and managerial structure), and environmental contexts (industry, government regulations, and competitors) are significant constructs for diagnosing e-business adoption [22, 47].

Since the initial introduction of TOE, several studies have diagnosed the different aspects of e-business adoption [23, 26, 48]. However, these diagnoses only explained the contexts that influence adoption and implementation, rather than the complex and dynamic technology-organisation-environment strategies adopted or in use to manage the three contexts. Thus, offering limited explanation of the social context and idiosyncratic perspectives of small firms' decisions in lowering the cost barriers. Below is a discussion of the TOE's three constructs and their association to cost barriers.

3.1 Technological context

The technological context, such as the internal and external IT infrastructure, is one of the TOE's three constructs that influence a firm's (or organisation's) e-business adoption [22, 47]. The technological context of TOE tends to include, but is not limited to, the internal and external IT infrastructure that is specific to a particular firm and their business needs, such as hardware, software, and processes (i.e. computers, internet, websites, payment processing systems, etc.) [23]. The possession or non-possession of the relevant IT infrastructure is a significant determinant and consequent influencer factor for e-business adoption.

From the e-business adoption literature, a clear prescription of the technological factors that constitute a cost barrier for small firms correlates with TOE's context diagnosis. For example, the technological context, such as the availability of technologies and technology characteristics, possesses the explanatory power to study direct costs (i.e. costs of e-business adoption, such as personal computers (PC), internet connectivity, access to telecommunications, and network facilities) [11, 13, 16]. Also identified are the complementary technological costs related to maintenance and upgrade of IT infrastructure [13, 16]. Whilst the latter technological context and prescription is clearly articulated, the strategies in use to manage context, barrier and actual costs incurred are unknown.

In exploring and describing the strategies of e-business adoption in use, this study will also follow DOI's key attributes or characteristics of technological context that are considered critical determinants for/and are positively related to the rate of e-adoption, such as perceived advantage, compatibility, trialability, perceived barriers, perceived risks, perceived ease of use, and perceived importance of compliance [45, 46]. Perceived advantage and ease of use will help in the understanding of the extent of the benefits behind small firms' e-business adoption strategies against the cost or possible alternatives, and how and why such strategies were compatible with their needs. Further, the study will explore the complexities associated with

the different adoption strategies, and the risk of trialability from the cost perspective, if any, which is necessary to explain the perceived barriers of strategies and compliance.

3.2 Organisational context

Alongside the technology construct, the organisational context (such as scope, size, managerial structure, internal needs, proactive technical orientation, technological, and financial readiness) is another TOE explanatory lens for diagnosing e-business adoption [22, 46]. The diagnosis of the organisational context is closely linked to the different descriptions of the complementary cost barriers of e-business adoption (see mapping of cost to TOE in Fig. 2). For example, knowledge and qualified staff of the organisation [13, 14], a lack of time [18], information [19, 20], and dealing with security issues [34, 49] are considered complementary costs barriers for small firms.

Although the latter complementary cost barriers are emphasised under TOE as organisational readiness, the readiness is prescribed from the knowledge and skills of technology. Yoon and George [46] describe technological readiness as information technology (IT) expertise and IT resources, technical competence, information systems (IS) knowledge and financial resources. Hence, this research finds it appropriate to use the organisational context of TOE as a construct lens for exploring the complementary costs and e-business adoption strategies related to knowledge, staff, information and lack of time.

Furthermore, the organisation contexts offer the opportunity to contribute towards an understanding of the internal factors or needs, such as the social context and idiosyncratic nature of SMEs. Whilst Eikebrokk and Olsen [50] and Jeon et al. [51] offer some insight into the knowledge competency necessary for e-business adoption by SMEs, there is little evidence of the knowledge possessed by existing SMEs that have adopted e-business, their associated strategies for acquiring information and managing time from both developing and developed countries, especially the possible integration through the systematic consolidation of resources and services.

3.3 Environmental context

The environmental context is the last construct for assessing e-business adoption within TOE theoretical framework. It includes external factors, such as the industry, government regulations, participation level in a professional trade association, and competitors that support or hinder the adoption [22, 23, 46]. The latter environmental context is appreciated by studies that reveal timely supply and distribution for delivery of goods [17], and knowledge and trade affiliation [19] as complementary costs and important determinants of successful e-business adoption for SMEs [13, 50, 51] within the ambit of government support [24, 51].

The current research study compares the cost of e-business adoption in developing and developed economies. This is mainly because the view of the developing and developed world is central in terms of understanding government support [13, 16], and it presents two different idiosyncratic environments in terms of resources and private services necessary for explaining the e-business adoption decision of small firms. The environmental context affect e-business adoption and the nature of adoption strategies and/or decisions by small firms. For example, with the support of business circles, such as the e-Commerce Resource Centre (ECRC), the Korean government was able to minimise red tape for internet startups, encourage IT, train e-business experts, provide technical assistance, conduct consulting services, and accelerate the adoption of e-business for Korean SMEs [51]. As such, for Korean SMEs, the cost of e-business adoption is not considered a determining factor, as their government provides ample support [51].

SMEs in developing countries are constrained by external factors that fall within the remits of industry service and government support, such as the lack of telecommunication infrastructure, e-business experts, limited consumer skills in terms of internet usage, timely supply and distribution systems for delivery of goods, low income, low credit card penetration, and low internet and computer penetration [8, 10, 16, 30, 39, 49]. Put differently, the government support available to developed economies is not the same as that in the developing economies [8, 16]. Therefore, it is fair to argue that the findings of the Jeon et al. [51] do not hold in a developing world context where issues of telecommunication infrastructure, distribution systems, internet and computer penetration are considered deterrents. Hence, the necessity of understanding the idiosyncratic nature of SMEs in the developing and developed world.

The next section presents the research design underpinning the study.

4 Research methods

The aim of the study being reported on was to adopt TOE as a theoretical lens to empirically explore the cost-effective e-business adoption strategies in use by micro-businesses in order to formulate a progressive approach intended to advance micro-businesses from having a mere web presence to performing transactions online. A qualitative multiple case study approach was considered appropriate for this study to explore small firms' unique idiosyncratic TOE environments. The suitability of qualitative research in producing rich and in-depth descriptions of the phenomenon (small firms) in its natural context, such as that of small firms and their engagement with the e-business world is discussed by Yin [52], and Clark and Creswell [53] in depth.

According to Parker and Castleman [35], it is necessary to consider the heterogeneity of small firms in explaining the e-business adoption decisions of such firms. The above-mentioned scholars warn of the risk of assuming homogenous idiosyncratic patterns of adoption factors to every small firm. The case study approach is one of the qualitative strategies that is suitable for exploring the heterogeneous complex descriptions of experiences in order to produce rich insight from multiple

perspectives on the subject matter [54, 55]. In particular, the current study adopted a case strategy in combination with semi-structured interviews. This approach enabled the building of personal relationships and trust as a creative approach that offered rich insight related to commercially sensitive information in terms of disclosing the actual costs of e-business adoption, e-business adoption decisions and strategies, and management situations. The significance of personal relationship and trust as a creative form of social interaction that yields genuine and open response is acknowledged by Welch and Piekkari [56] and Douglas [57].

The case study approach also enabled observation of the e-business platforms of the eight case studies. The merits of this approach in using multiple sources of data to complement the interviews have been endorsed by previous studies [54, 55]. The exploration used TOE as a theoretical lens to follow e-business cost barriers as a guide for gathering insights from small firms, which were crucial in developing a systematic interpretive strategy. From the literature, five direct cost barriers and five complementary costs facing small firms were gathered and classified into TOE theoretical constructs and contexts. The cost barriers identified from literature were used as the measure of directive themes in prompting and exploring issues on the interview guide. Government support is considered as one of the great environmental determinants of TOE that defines the idiosyncratic context necessary for the cost of e-business adoption by small firms; therefore, issues related to the government support received by small firms were also explored.

4.1 Sampling

Eight micro e-businesses in the clothing retail industry were purposively selected for the study as they exhibited potential similar demographic patterns, such as the classification of e-business (B2C), number of employees, length of operation, and homogenous retail market (see Table 2). The number of case studies selected exceeds the minimum four cases specified in the guidelines, and the requirements necessary for a multiple case study strategy suggested by Stake [58].

The use of the multiple case study approach considers the selection of multiple bounded systems (or cases) as a research approach that leads to a rich understanding of the phenomenon under study [55, 59]. According to Plano and Creswell [59], considering the specific characteristics of access population is important in achieving a focused outcome and to aid in minimising variation. The areas where the small firms exhibited heterogeneous patterns or high idiosyncrasy were in terms of their e-business operation and management, e-business adoption strategy and decisions, and their social contexts.

Retail markets, specifically the B2C e-business classification, were purposively sampled as they represent a major sector where small e-business firms operate in both South Africa (SA) and the United Kingdom (UK) [60]. These consequently allowed access to small firms that could produce the rich information necessary to enable great insight into e-business adoption costs and strategies, a more focused approach discussed by Palinkas et al. [61]. To this end, small clothing e-retail firms

from the UK (representing developed markets) and SA (representing African developing countries) were sampled. The choice of SA was made because it is the most dominant internet centre, with the largest telecommunication sector on the continent, and has advanced B2C markets, environmental conditions and ICT infrastructure [12], and it has the highest number of B2C markets on the African continent [60]. The UK, on the other hand, has the largest B2C market in terms of dollars, fashion e-commerce revenue, and the highest electronic gross domestic product (eGDP) in the entire Europe [62–64].

The merit of purposive sampling in focusing on a particular segment of a target population and in controlling the extraneous variables necessary for increasing internal validity is discussed by Daniel [65]. The location of the small firms in the two countries offered little relevance, as they were all virtual businesses. Table 2 below provides a summary of the profile of the eight case studies.

4.2 Interviews

A semi-structured interview guide was used to prompt and explore insight into the cost-effective e-business adoption strategy in use by the small firms. Saunders et al. [55] and Yin [52] provide an in-depth discussion of the merits of semi-structured interviews in prompting and exploring the necessary information related to a phenomenon. The interview guide consisted of two categories of direct cost-barriers and complementary cost barriers that emanate from technology organisation and environment contexts.

In the first category, small firms were asked questions related to the direct costs of ICT equipment, website, network facilities, hardware, re-organisation, electronic data interchange (EDI) and/or software for facilitating transactions, as derived from literature [13, 16].

The second category focused on complementary costs, such as hiring qualified personnel (with managerial knowledge), dealing with legal issues, ongoing costs of maintenance and upgrade, as well as delivery costs [13, 16].

Three of the interviews were conducted face-to-face in 2013 (and revisited in 2019), four interviews were conducted in 2020 through skype videos (due to Covid-19 pandemic travel restrictions), and one comprised a 2013 telephone interview due to distance (and revisited in 2019). Semi-structured interviews with the complement of website observation constituted the primary data collected for this study. The in-depth interviews took between 40 and 100 min. This was to ensure that respondents provided detailed information about questions related to their businesses, and to assess how well the businesses understood the entire concept of e-business.

Although the literature strongly emphasises the idiosyncratic nature of small firms, efforts were purposively made towards interviewing small firms with homogeneous business demographic details, such as number of employees (small firm determinant), classification of e-business (business to customers or B2C), and homogeneous retail characteristics (clothing retail). This was done mainly to minimise variation from e-business classification and trade category perspectives, whilst enabling the exploration of variability within small firms in the same trade, and

Table 2 Sampling profile

Economy categorisation	Samples	Small firm description	Sampling criteria				Market category
			E-business classification	Years in operation	Number of employees	Location	
Developed economy	Joy and Joe https://www.joyandjoebaby.com	Baby wraps and carriers, clothing	B2C	10	5–10	UK	Clothing e-retail
	Company B	Clothing firm for adults	B2C	8	2	UK	Clothing e-retail
	Favouritenest.com https://favouritenest.com/	Baby clothing	B2C	1	1	UK	Clothing e-retail
	DariaNaturalStyle https://www.etsy.com/uk/shop/DariaNaturalStyle	Clothing accessories such as hand-made luxury headbands, unique silk scarves	B2C	<1	1	UK	Clothing e-retail
Developing Economy	Makoya Brand http://www.makoyabrands.co.za	High-end and designer brands clothing	B2C	5	1	SA	Clothing e-retail
	Manmade Executive http://manmadeexec.com/	Men's executive wear	B2C	8	6	SA	Clothing e-retail
	Oui Oui couture https://www.ouioi.co.za/about-us/	Plus size luxury customised clothing	B2C	1	1	SA	Clothing e-retail
	P-styles creation https://m.facebook.com/pstyles03/	Ladies fashion	B2C	6	1	SA	Clothing e-retail

ensuring that the cost-effective e-business adoption model formulated could assist other small firms that exhibit similar demographic characteristics, contexts and business goals. All eight studies sampled gave permission to disclose their business names.

4.3 Data analysis

All interviews were recorded on mobile or laptop audio instrument and were later transcribed, coded, and analysed using ATLAS.ti (a computer-aided qualitative data analysis software). The first step used in ATLAS.ti involves open coding, followed by inputting coding groups or themes (also known as axial coding). Open coding was the starting point of the analysis that explored the e-business adoption strategies and associated costs related to the technology organisation and environment contexts. The strength of open coding is in capturing meaning and generating codes that small firms use to describe their own environments (TOE). Babbie [66] emphasises the significance of open coding at the start of analysis and cautions that failure to open up the transcripts compromises the analysis and communication that follow the research.

In this context, words and phrases that reflect the narrative of small firms' accounts of the idiosyncratic patterns of e-business adoption, TOE strategies and associated costs were used as the first stage of coding (e.g. family, friends, websites, domain, etc.). After the open coding process, hierarchal axial coding was used to identify and connect multiple codes to aggregate coded themes that were derived from literature. Axial coding is the second phase of analysis that envelops the creation of themes or categories by grouping codes given to words or phrases [66, 67].

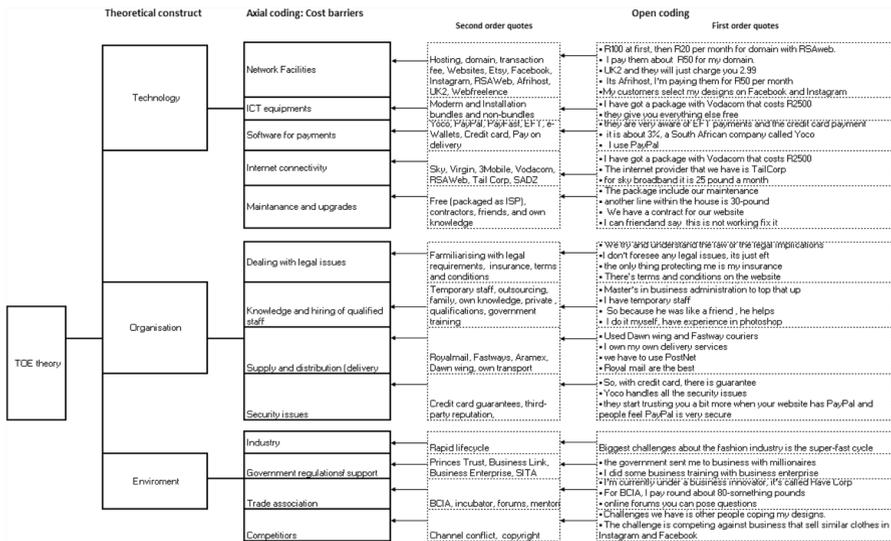


Fig. 2 Example of coding process

For example, open codes, such as domain, website, hosting were connected to aggregate codes of direct costs barriers such as network connectivity, and technical ICT equipment (see Fig. 2). Hence, open codes such as forums, private incubators, and YouTube were combined to aggregate codes of complementary costs, such as e-business knowledge and hiring of qualified staff. The coded themes from hierarchical axial coding were combined as significant inputs for thematic development and the iterative process between themes that emerged from the data and TOE's theoretical lens. For example, aggregate codes on network connectivity and technical ICT equipment, amongst others, were combined to form and reflect the technological construct of TOE.

The applicability or transferability of the study involves one of the approaches outlined by Polit and Beck [77] of providing a background description of the research context, and an outline of the methodology, as well as preserving the transcripts, which were shared with the small firms after the interview session and are also outlined in this article. Hence, the audio record and transcripts of the perspectives of e-business adoption and strategies from eight small firms operating in two different economies, and observations of their virtual platforms were some of the practices and evidence considered appropriate and relevant for convergence and support of the constructs discussed by Yin [54]. The audio and sharing of transcripts are methods used in achieving trustworthiness associated with the qualitative approach. The findings below integrate the TOE strategies in use and the associated costs related to e-business adoption between the two economies.

5 Findings

This study used the TOE theoretical lens to elucidate the various e-business adoption strategies used and the associated costs incurred to lower both the direct and complementary costs barriers. The findings revealed the complex and dynamic technology-organisation-environment strategies adopted or in use to manage the three contexts by small firms, which embody interesting themes of TOE in relation to direct costs, complementary costs of e-business adoption, e-business adoption strategies, private and public services in use, and the idiosyncratic nature of the eight case studies representing SA and the UK, as discussed below.

5.1 TOE: technological context construct

The study found three dominant e-business adoption options and/or portals used by small firms in SA and the UK, namely, websites, third party, and social media. The latter three categories of portals embody the different strategies and costs of e-business adoption respectively (see Table 3). Hence, the strategies and costs adopted, or in use, are broadly discussed from the perspective of the three e-business options or portals vis-à-vis technological context cost barriers.

Table 3 Technological context e-business cost barriers

TECHNOLOGICAL CONTEXT		E-BUSINESS PORTALS IN USE AND ASSOCIATED STRATEGIES											
E-BUSINESS COST BARRIERS		Website portal					Third party portal					Social media portal	
Cost Items	Description	UK Cases 1-3					SA Cases 4-6					UK Case 7	SA Case 8
	<i>Strategies in use and costs</i>	Web design	Domain	Hosting	Web design	Domain	Hosting	Product listing	Advert	Transaction			
Network facilities	<i>Private companies</i>	Siteground	UK2 and OVH	UK2, Siteground	Webfreelance, Aneasu concepts, and CLUED media	RSAweb, Afrihost, and Domain.co.za	Afrihost, Webfreelance, and Domain.co.za	Etsy			Facebook and Instagram		
	<i>Associated Costs</i>	£1-1500k (F)	£20pm-£60 pa (V)	£10-60 (V)	R7500-15k (F)	R20-125pm (V)	R50 pm-1700pa	£0.002 per listing	Per product £10-£17 advert	per sale	No network connectivity costs		
	<i>Strategies in use (third party secure platforms)</i>		PayPal		Yoco	Mygate	E-wallets, EFT, PayFast and credit cards	Embedded			E-wallets and EFT		
Software and re-organisation for secure payment	<i>Associated Costs</i>		3.4% plus 20pt (V)		3% pt (V)	R700pm (V)	3.50%	5% pt, 3% for payment, \$0.25 processing (V)			Bank charges		
	<i>Technical ICT equipment and tools</i>	Sky	Virgin	3 Mobile	Vodacom	TailCorp	SADZ	None	£0.00		Vodacom and Telkom		
Internet connectivity and access to telecom	<i>Internet Service Providers (ISP)</i>	Sky	Virgin	3 Mobile	Vodacom	TailCorp	SADZ	Virgin			Vodacom and Telkom		
	<i>Associated Costs</i>	£25 (V)	£25 (V)	£17 (V)	R2500 (V)	R1480 (F)	R1000 (F)	£25 (V)			R132.00 Pw Telkom and R160.00 pw Vodacom		
ICT Equipment Maintenance	<i>Maintenance and upgrades</i>	Web maintenance	Internet	Internet	Web maintenance	Internet	Internet	Web upgrades	Internet upgrades		No maintenance costs		
	<i>Private companies</i>	Family, friends, own knowledge	Internet and ICT equipment	Internet and ICT equipment	Friends, own knowledge, third party (300)	Internet and ICT equipment	Internet and ICT equipment	Web upgrades (Etsy)	Internet upgrades (Virgin)		None		
Complementary costs	<i>Associated Costs</i>	GBP	£0.00	1055 to 1645	R300	R0.00	R0.00	£0.00			R0.00		
	<i>Aggregate costs per portal and country</i>	per month, pa = per annum, pt = per transaction, pw = per week:	1055 to 1645	1055 to 1645	ZAR	ZAR	9224 to 17550	GBP	27 per month		ZAR 292, per week		

Notes: f= fixed costs, v= variable costs, k= thousand (\$), pm = per month, pa = per annum, pt = per transaction, pw = per week: the combination of the lowest web portal costs in SA doesn't belong to one company. For example, in ZAR, Case 3 is: 7500+12.5+599+100=9224; Case 1 is: 12000+120+700+750+1480+1700+300; Case 2: 15000+50+2500=17550

The technological context of e-business adoption in relation to the direct and complementary cost themes were guided by the literature, and include costs of network connectivity, ISPs, software and re-organisation for secure payment, ICT technical equipment, and maintenance.

5.1.1 Website e-business adoption option

The option of adopting a website e-business is the most prevalent and the most expensive adoption method of the three options. Six case studies preferred and used the option, regardless of the aggregate technological costs that range from £1,055.00 to £1645, and R9 224 to R17 500 in the UK and SA, respectively (see Table 3). The perceived advantages emphasised by the six case studies provide two interesting insights, unrelated to costs. The first insight is the perceived advantage of brand image and need for a strong identity of the business to attract exclusive market segments.

In fashion, French is known for female clothing, Italy for men's fashion and Spain is very strong in kids' fashion. My wife is from Spain and speaks very little English. We needed a business for her and our website tells the whole story about our target market, standards, and quality of our products. Especially, kids' style, quality of fibres and manufacturer. The business is like translating my wife's background and putting into the web. We wanted to be exclusive and for our customers to feel that.

The second insight is related to the lifestyle that embodies the needs of a certain market segment that is often less represented in the market. In this regard, the small firm said "the brand was born for my immediate needs, which is to buy clothing for me as a plus size woman. I struggled to find clothing that represented myself, and personality at any given point".

In some instances, some case studies that have adopted the website option appear to increase their digital footprint by having a significant presence in social media and third-party portals (i.e. eBay), which not only increases sales opportunities, but is also significant for trialability, trust building, customer retention and to optimise the search engine results necessary for redirecting traffic to their web portals. Put differently, the small firms that adopted the website option do not emphasise the perceived advantage in relation to other e-business adoption options (social media, and third-party portals), but rather see them as complementary channels that increase digital footprint and sales, and it is compatible with their business strategy.

I was able to allow customers to see and to test the products themselves through eBay which was really good. The good thing about eBay was the feedback system. Luckily for me we had good feedbacks, if you go to eBay and see our feedback, we have now been awarded top rated seller because eBay has a rating system. I also started a blog because I know that when selling baby products, customers would like to connect to real people, who can share experiences, it connects people, because actually anyone can set up a business

but people want to connect with real people, so people tend to rather buy from people they know and understand, which direct them to my website

Of particular interest is their interpretation of perceived risks. Some small firms with the website option consider those small firms that adopted social media as their only e-business portal as great risks that threaten their e-business models and sustainability. The channel conflict expressed is that “the challenge that we have to overcome is competing against business that sell similar clothes in Instagram and Facebook but not formally registered for VAT. They do not have a dedicated online shop and we feel it is not correct or legal. We wish government can regulate them because it is affecting business that pay tax like us.”

The technological context costs of small firms that have opted for the website e-business option envelopes network connectivity (such as domain registration, hosting and website design), ISP, and payment processing software, but less costs are related to maintenance and ICT equipment tools. This is mainly because the maintenance and ICT equipment barriers identified from literature are offered as part of the ISP package, especially for those small firms in the UK, for example, “I use Sky and they give you everything for I just pay £25 monthly instalments, but there is a extension, £30 for a second extension”. However, in SA, ISP packages are only observed from some companies, such as Vodacom, and at a steep fee, such as “I have got a package with Vodacom that costs R2500, that is a monthly package for a sim”. Others companies also charge installation fees (i.e. TailCorp).

The strategies used by the case studies to manage the direct and complementary costs barrier encompass the use of private companies, outsourcing, and support from friends and family (see Table 3). For example, network connectivity, such as domain and hosting, is managed by companies such as RSAWeb (R100 once off, then R20 per month), Afrihost (R50 per month for both hosting and domain), Webfreelance (R1700 per annum for hosting), UK2 (£2.99 per month or £20 per term for domain and £10 for hosting), and OVH (£60).

Web design is provided by companies such as Webfreelance (R12 000), Anesu concepts (R15 000), CLUE'D media (R7 500), and Siteground (£1500). Website maintenance is mainly subsidised by friends, spouses, third-party contracts, and small firm owners' knowledge. An example of friend support that was emphasised by all seven businesses is “I have a friend who had we design business, but closed it down, But, because I know him as a friend I can just call him now and say look, this is not working fix it.” For the small firm that pays for website maintenance and upgrades in SA, the cost is R300. The small firm opines that “We have a contact with those that take care of the maintenance of the website; anything that may need updating there is a graphic designer, in house, that runs that and takes care of it. It's about R300”.

Internet service providers (ISPs) is another technological context of direct costs that has been identified as a barrier for small firms. For example, ISP companies, such as TailCorp (R750 per month), Vodacom sim card package (R2 500 per month), and SADZ (R1000 installation, and R599 per month) Sky (£25 per month), 3 Mobile (£17 per month), and Virgin (£25 per month) are private

companies used by six case studies for internet connection and for lowering both ISB and technical ICT equipment cost barriers. The choice of ISP was reported to be influenced by the speed and reliability of the broadband offered across both countries. The emphasis is that:

As an e-tailer, you have to make sure that everything is working fast like broadband speed, you don't want to go with a cheap broad band like Talk Talk, because you could be looking at your transactions or going into PayPal or whatever, now suddenly it starts messing about and cutting off.

Looked at differently, the market pressure that induces competitive packages between ISP companies, indirectly influences the adoption of e-business and lowers some of the direct technological costs. Whilst ISP competition benefits small firms in the UK, the same is not observed in SA. For example, issues of internet/modem and broadband maintenance are not bundled with modem and installation by companies such as TailCorp and SADZ. For example, "I paid for installation and the modem which came to about R1480, once off, and now we just have the monthly fee of R750 per month". The South African small e-retail firms appear to have a mixture of approaches influenced by the cost of data. For example, according to one of the participants:

My choice of internet was based on the costs related to data and speed. I had to make a comparison in the market and said ok, as much as it's accessible from most places it's not e affordable. So that is why I had to add another line, which is a Cell C line, which just allows me to have data and I could do work from the space where I am.

Software and re-organisation for secure payment focus on the processing of online transactions. Small SA firms revealed payment processing costs of R700 with Mygate, a 3% processing fee with Yoco, e-wallets and EFTs, and 3.5% processing fee with PayFast for case studies 1, 2, and 3 respectively (see Table 3).

South African small firms contend with bank charges, hence, the UK small firms are appreciative of banks, such as HSBC, that offer start-ups with a bank account that is free for the first year of business and thereafter, charges of £6 p.a. The small firms offer different rationales related to their choice of payment options. Credit cards are preferred because of the perceived trust and security for both e-tailers and consumers. The expression is that "with credit card, there is guarantee that should, in an unlikely case, that something goes wrong, the bank is going to refund you the money. In case of risk area such as the fraudulent credit card purchases. Mygate point out suspicious transactions which the bank investigate". The same rationale was offered for those that use Yoco, in that "Yoco handles all the security issues, we don't have to pay anything extra".

Whilst the other UK case studies did not indicate any processing fee, a review of their PayPal method showed a 3.4% plus 20p processing fee per transaction [69]. From the South African case studies, the aggregate of the actual variable and fixed technological context costs of e-business adoption were R9 224, R17 050, and R17 550 for case studies 1, 2, and 3, respectively. Hence, for the UK

case studies, the actual variable and fixed direct costs of e-business adoption were £1,055.00 and £1,645.00, for case studies 4, 5, respectively, and none was disclosed by case study 8 (due to commercial sensitivity reasons).

Interestingly, using a £1=R17 currency convention rate [68], the highest aggregate technological context costs of website e-business adoption is higher in the UK than in SA. The difference in rand (ZAR) currency was R10 421 and £613 in pounds (i.e. $R17\ 550/17 = \text{£}1032$, which is $< \text{£}1,645.00$).

5.1.2 Third party e-business option

The third-party e-business adoption option offered by technology savvy companies, such as Etsy, eBay, and Notonthehighstreet, offers a relative advantage that can balance the website and social media e-business options. The perceived advantage emphasised by the small firm using this option is that the platform creates e-commerce opportunities for start-ups at the base of the pyramid. For example, a lower investment is required for adoption, and the package is an integrated suite of business applications. Further, the platform opens limitless opportunities of national and international access to markets and competitors. Access to competitors provides business intelligence for small firms to compete in the market and for e-commerce trialability. The participant expressed that:

The platform provides me access to many existing customers and to the world of competitors. Of course, when customers search for a headband or scarf, 30 000 shops appear alongside mine. But I also have information about my competitors and I can browse through their products to see what is unique compared to mine and their sales statistics. The good thing is that I don't need to worry about building a website or pay options, it is all included

The compatibility of third-party e-business adoption is three-fold. Firstly, it is relative to the business model (retail clothing) with less perceived risk of damage, storage, and management. The small firm opines that "I needed a business that would not take much storage because my house is small, hence, I decided on light materials such as scarves and hand bands. The hand bands and scarves are easy to fold and are less likely to be damaged during transit and cost less to post to customers"

Secondly, the compatibility relative to circumstantial changes, such as raising a family. The assertion by the small firm highlights important aspects that influence e-business adoption, beyond the perceived factors of the organisational context. "For example, I resigned from my job to raise kids. Nursery where I leave is £72 a day, and the average salary is £1250, which is far much more than the nursery, and this was the best way for me to earn something, and experiment with my passion whilst raising my kids". In this context, the decision to adopt e-business as a source of possible income, whilst raising a family was influenced by circumstantial family changes.

Thirdly, the advantages related to use, for example, the small firms credit YouTube tutorials that provide basic on-boarding information at no cost. The digital tutorials are highly preferred due to the competing priorities of family and business,

which makes less room for face-to-face training. The small firm expressed the view that “the platform provides YouTube tutorials and online support that is easy to navigate. Although they charge for some information, they give basics for free. I have two kids, and have to cook, clean and do not have time to attend face-to-face training”. In relation to this option, the small firm also uses the social media option as a complementary channel for search engine optimisation and for redirecting traffic to the portal. Hence, the website option is viewed as the next step forward following business growth.

The technological costs of this option include network connectivity and ISP only. This is mainly because hosting, domain, web design, and maintenance are the primary function of the third-party portal. Network connectivity for this option is described differently from the small firms using the website option to include an integrated package of product listing, transaction (i.e. payment processing, sales profit share, and search engine optimisation), and advertisement fees (see Table 3). The third-party portals, such as Etsy, eBay and Notonthehighstreet.com, offer a lower cost-integrated package that lifts the weight of hosting, domain and website design for small firms (i.e. Etsy offers £0.002 per product listing = £2 per month for ten products, 5% transaction fee per product, 3% for payment, \$0.25 processing fee and £10 -17 per product advertisement). The small firm equally benefits from the ISP, internet maintenance and associated equipment package offered by Virgin at £25 expressed in the website option. The breakdown of the costs is:

I pay 0.002 per item listing, which is £2 a month for my ten products. There is also 8% + \$0.25 which include transaction fee, payment processing, and processing fee... For my internet, I used 3 Mobile with my husband for £17 a month, but network was weak in this area, hence we changed to Virgin for £25 a month. Most of the costs for my business are with design, printing of my design patterns into the fabric, sourcing rare silk, and sewing. The total combined investment including production of my ten products is £2000.

At an aggregate cost of £27 (i.e. £2 listing fee per 10 products + £25 ISP per month), with exceptions and exclusion of optional advertising costs, 5% transaction fee per product, 3% for payment, \$0.25 processing fee, this technological context e-business adoption option is one of the cheapest used by small firms.

The challenge expressed with this model is that of the unique selling point (USP), referred as hyper-differentiation by Church and Oakley [75]. Whilst third party e-business portals offer lower costs of e-business adoption, the cost of advertisements appears to be high. “For example, the advert for making my products come at the top of every search is £10–£17 per product and if the customer follows the link, but end up buying another one of my listed items through the ‘advert link’, the charge still applies”.

5.1.3 Social media e-business adoption option

Social media portals, such as Facebook and Instagram, offer an alternative e-business adoption opportunity apart from the third-party and website options. Internet access or data (ISP) is the only cost associated with the technological context of

the case study using the social media e-business option. As such, the social media e-business option case study reports the following: no network connectivity, and maintenance upgrades are not required. However, it reveals the high cost differences in internet costs between SA and the UK. For example, whilst the *monthly* cost of internet access is approximately £17–25 in the UK, the *weekly* cost of internet data for the case study in SA is reported to be R132.00 (£7) for Telkom and R160.00 (£9) for Vodacom, an aggregate of R292 per week (£16), which is an aggregate of £69 a month. According to the case study, Vodacom offers an expensive, but faster internet connection, which is useful for uploading clothing ranges onto the social media platform. Whereas, Telkom offers cheap, but slow internet access that is good for communicating with the customers. The two networks are considered complementary in terms of cost and speed. The small firm expressed this view:

I have prepaid phones with Telkom and Vodacom that I use for my business. It is very expensive and I pay lot of money. I then realised that Telkom is cheaper, i.e. charge me R132 for 9G for seven days, but network is low. Vodacom is quicker and most reliable network with connection, but expensive charge R160 for 10G a week. I do not have a PC and use the quick network for uploading pictures and cheap one for talking to my clients

The case study firm has no laptop, and mainly operates from a mobile phone. The owner emphasised the perceived advantage of entry to market, trialability of experimenting with e-commerce, ease of use, and wider reach to customers as the cost of data only. The small firm opines that “Since I do not have an online shop, Instagram and Facebook were my only option to reach different types of customers. The platforms helps me to reach people who are near and far, but I do plan to expand and have a website one day”.

The social media e-business option reveals the transformative strength of social media and mobile phones in e-business adoption for those small firms with limited resources. In particular, how small firms’ resources orchestrate unintegrated bundles of technological contexts to adopt e-business. For example, unintegrated technological bundles of social media, such as Facebook and Instagram, serve as an e-store, while financial e-transactions, such as e-wallets and EFT, serve as the e-payment platform, which although unintegrated, are easily accessible by customers and small firms on their mobiles.

5.2 TOE: organisational context

The exploration of the costs associated with the organisational context of e-business were also guided by e-business and TOE literature (see Fig. 2). The factors influencing small firms’ e-business adoption from the organisational context emphasises readiness in terms of e-business or e-commerce knowledge and skills of technology (staff and business owner). In addition, ensuring the security of the e-business is considered as one of the most important features of successful e-commerce, in combination with dealing with legal issues and issues such as a robust supply and

distribution of e-commerce goods which reflect the internal needs and financial resources of the organisation context.

The latter organisational context issues were explored and found to represent mainly the complementary costs of e-business across the eight case studies with very similar strategies. Whilst the fixed direct costs of e-business adoption can be observed, the opposite does not hold in some of the classifications of complementary costs. The rationale for the lack of actual monetary figures differs per type of complementary cost, but the most common reason is that complementary costs are offered as a bundle package or subsidised by family and friends (see Table 4). Below is a detailed account of the strategies in use and associated costs.

5.2.1 Knowledge and hiring qualified staff (IT/IS/E-business/e-commerce)

The eight case studies possessed no IT or e-business-related qualifications, rather general qualifications from engineering, economics, marketing, corporate governance and finance, and environmental studies. The majority relied on their own experience and temporary contract staff to address issues that required expert knowledge, which in most cases were not necessarily IT-related, rather sewing and other business processes. The ad hoc staff were recruited based on demand. For example:

I have temporary staff, who work with me some days depending on how much orders I have. It is much more economical for us. If I have people signed up to me as permanent staff, it is going to cost me too much so at the minute. I am doing this through pay as you go, like I have a lady who I get to place some adverts, I wanted someone to do some modelling of my products and things, I will sign a contract, just a short term contract, after the job was done I pay her.

As such, the costs evaluated were limited to e-commerce/e-business knowledge specific, and no other business processes' expenses were evaluated in both countries (UK and SA). Outsourcing, academic qualifications (i.e. economics, environmental science), family, friends and apprenticeships are the four additional methods used in dealing with the complementary costs of hiring qualified staff. For example, assistance with marketing "Family played a major role in support of the business and assisting by marketing (especially word of mouth and referrals)." And assistance with order management "I have a husband who helps me to do the hosting and orders and handles customer enquiries"

In addition, forums, Google, professional bodies, such as the Baby Carrier Industry Association (BCIA), and government training, such as the Business Course with millionaire, Business Link, Business Enterprise Fund and the Prince's Trust were found to be environmental context factors that appear to enrich knowledge gaps in the organisational context. However, the knowledge from the reported government and professional bodies were not related to IT, but rather to general business aspects, such as accounting and marketing. There is also private training, such as offered by The School of Babywearing that is considered by a small firm in the UK. The small firm that is a member of BCIA pays membership of £80 per annum.

Table 4 Organisational context e-business cost barriers

Organisational context e-business cost barriers		E-business strategies in use and costs							
Cost Elements	Description	SA				UK			
		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
<i>Complimentary costs</i>									
Knowledge and hiring qualified staff	<i>Hiring qualified staff and spouses. private incubators (Rave Corp)</i>	Ad hoc staff and spouses.	Ad hoc staff and Own knowledge	Ad hoc staff and Friends	Own knowledge	Friends and Own knowledge. Previous experience in clothing retail	Ad hoc staff and Spouses. Professional bodies (£80pa), forums	Outsourcing and Spouses	Friends, Own knowledge and YouTube. Previous experience in retail
	<i>Staff qualification</i>	BTEC engineering, Master of Administration	Bcom Economics	Diploma in marketing	BA corporate governance	Government training (Millionaires course)	BSc Environmental Sciences and Government training (business Enterprise) £80pa	Government information	Bcom Economics
Legal issues	<i>Associated Costs</i>	R0.00	R0.00	R0.00	R0.00	£0.00	£80pa	£0.00	£0.00
	<i>Strategies in use</i>	Familiarize with legal requirements	Preventative strategy	free help from Attorney friend, and insurance	Spouse's legal subscription	Terms and conditions	Insurance	Accountant lawyer	Terms and conditions
Security issues	<i>Associated Costs</i>	R0.00	R0.00	R600.00pa insurance	R00.00	£0.00	£600.00pa	£60.00ad (V)	£0.00
	<i>Strategies in use</i>	MyGate	Yoco	EFT	EFT and e-wallets	PayPal	PayPal	PayPal	Third party

Table 4 (continued)

Organisational context e-business cost barriers		E-business strategies in use and costs							
Cost Elements	Description	SA							
		Case 1	Case 2	Case 3	Case 4	Case 5	Case 6	Case 7	Case 8
		UK							
		Cost factored under technological context							
	<i>Associated Costs</i>	Cost factored under technological context							
Supply and distribution of Goods	<i>Strategies in use</i>	Dawn wing and Fastways couriers	Postnet and own delivery car	Aramex		Royal mail			
	<i>Associated Costs</i>	Varies per kg	R100 for 1–2 kg	R100, flat shipping rate in SA		Varies per kg			

kg kilograms, *pa* per annum, *ad* adhoc

In SA, none of the four SA small firms had received any government training support. The small firms hold academic qualifications, such as Bachelor of Technical Engineering, a Master's in business administration, Bachelor of Commerce in economics, marketing diploma, corporate governance and finance. Complementary to an academic qualification, one small firm received support from a private incubator:

There is one that I would like to mention, which is not a government. I'm currently under a business innovator, it's called Rave Corp. And it's not government-sponsored, so these are like private companies or private entities that are forming this business innovator, which are doing this business training.

5.2.2 Dealing with legal issues

Insurance and terms and conditions disclaimers on the website are two methods used by the UK case studies in dealing with legal issues. For the small UK firms with public and product liability insurance cover, the cost is £600, and the cost of the accountant/lawyer for the third firm is £60, on an ad hoc basis. However, there is no protection for other aspects of the business, such as in the case of a supplier who once delivered a faulty machine. The small firm expressed this view:

The only thing that is protecting me is my insurance but I know that in future we should have a proper lawyer because we have had an issue with an equipment from a seller. It was an embroidery machine for our business that was defective upon delivery. I had to go through my bank to get the money back, but the suppliers will fight it because he has a good lawyer. I am paying about 600 lb annually for the insurance, which covers my public and product liability. So, if anybody was to accidentally sue, I am covered in the UK and not in the whole of the world.

In SA, one small firm cited the expensive cost of subscribing to a legal firm and its continuous efforts in understanding legal requirements, while another pays insurance that offers legal advice for R600 per annum. The third firm foresaw no legal issues arising from its operation due to avoiding website payment methods and only using electronic funds transfer (EFT) for payments as a preventative strategy. Hence, the fourth case study relied on the spouse's legal cover. One legal example encountered by one small firm in SA related to the usage of branded products, whilst the UK example related to supplier's issues.

"We don't have any legal handling system in house. But we try to understand the law or the legal implications around e-commerce or our brand. It's something that we will definitely like to have in place, but the cost of legal services is very expensive. We had a legal issue not that long ago, regarding the latest branded sneaker. So the local distributor actually had their law firm contact us, saying 'We are not supplying you with those sneakers, so you cannot use the brand name or logo in a certain way', and we had researched about it, and the only thing we had done according to the Consumer Protection Act was to notify the customers that we are not authorised with the brand. So basically the law firm that contacted us to say 'No, there's nothing we can do to stop you selling the branded sneaker, but just make sure you

comply with the Act'. So we tried to avoid any legal battle because we kind of complied, and also put notice on our website".

5.2.3 Dealing with the costs of security issues

PayPal, EFT, e-wallets and credit card payments (i.e. services offered by Mygate and PayFast) are cited as methods of ensuring security for e-business operations by the eight small firms. One small SA firm considered credit card payments as secure due to their bank guarantees, whilst another considered EFT and associated proof of payment as secure.

The reliance on PayPal by the UK small firms stems from its secure reputation and global usage. Put simply, the security issues that the eight small firms emphasised were focused on the processing of payment and transactions. The costs associated with security issues are therefore, embedded within the direct costs of processing payments under the technological context (see Table 4).

5.2.4 Delivery cost

The use of courier services and own delivery vans are the two delivery strategies used by all small firms in the UK and SA. Courier service costs are based on the weight in kilograms (kg) of the parcels, which is cited as R100 for 1–2 kg in SA. Popular courier services used in SA are Aramex (offering a flat shipping rate of R100 in SA) and Postnet. The UK small firms rely on the services of the Royal Mail.

Whilst some SA case studies report security issues with the reliability of some courier services, such as "losing parcels with Aramex", the UK case study appears to be appreciative of the Royal Mail's services. "We have a tracked sign service with Royal Mail. They gave us a business account with a better discount rate for our parcels. The good thing is that we do not have to queue. We drop our parcels with our business account details and they do everything for us. The UK is very good with support system like that of the Royal mail".

5.3 TOE: environmental context construct

The importance of government support in providing an environment conducive to small firms' e-business adoption has been discussed in depth by previous scholars [22, 23, 46]. Also important is the role of government in developing the necessary infrastructure (i.e. mediating IT infrastructure, road infrastructure) [16, 46], as they have a significant interrelation with the network design and reconfiguration for the delivery of e-commerce goods, especially in developing countries, such as SA, with its urban, township, and rural design [49].

Within this context, the current study explored the environmental context, such as industry issues, competitors, and awareness of government support services, including the case studies' assessment of supporting infrastructure in relation to the direct and complementary costs of the environmental context. The specific environmental costs raised are IT, knowledge, finance and industry-related, as discussed below.

5.3.1 IT mediating infrastructure

Critically, within the government support context, is network infrastructural issues, such as the telecommunications necessary for the adoption of e-business [70]. From the interviews, more issues related to telecommunication infrastructure were evident in SA than in the UK. Telecommunication infrastructure issues, such as limited options of ISP providers, reliable and expensive internet access that shapes decisions in terms of the adoption of small firms were raised by all four SA small firms. They commonly emphasised that:

Internet issues are another case, if you try to do work from outside your space and you have to communicate, sometimes the Internet access is no available. Also, the costs related to data are high. So, you always have to find the cheaper way to find data and airtime. So, I had to make a comparison in the market and said okay that as much as it costs it's accessible from most places or it is not quite affordable [...] we have tried to do Telkom and other companies, other companies are quite affordable, but the reliability of connection in certain areas was not so great, and that is why we ended up saying the most important thing for us is to be connected without a hassle, so we needed to go with who can give us what we are looking for regardless of the cost.

5.3.2 Knowledge support

In the UK, Business Link and Business Enterprise are two government support institutions that provide training to small firms. Business Enterprise offered one small firm training which was not specifically related to IT, but marketing and finance. "I did some business training with business enterprise, the training was free because it was sponsored, and I learnt about accounting and marketing which was really good". The Prince's Trust provides support with grants for business owners under 25 years of age, but none of the two UK small firms benefited from the Trust. Instead, mentoring training was received by one small firm from a government programme, for example:

Long time ago there were often business courses with millionaires. They had nothing to do with their own businesses because they had so much money and they had free time. So, they set up a business association a long time ago and the government sent me there and I stayed with them and studied business, which was better than actually going to the school. It was actually having one to one it wasn't even in a class [...] I'm a member of Business Link, teaching me cash flow, and old basic training which they are teaching to people now [...] There is also Princes Trust where you have to be under 25.

In SA, one small firm highlighted knowledge of the existing government support, such as the State Information Technology Agency (SITA), which provides training but appeared discouraged by the slow pace of response. The issue raised by the small firm is that "as a small business, if you don't receive a certain training at a

specific time, you are finished. The government gives you training that helps you ten months later. I don't see that as a training".

5.3.3 Financial support

In terms of financial support, one small firm acknowledged support offered by the National Youth Development Agency (NYDA), which is known as government support to young entrepreneurs in SA. However, from the quote below, it is clear that the small firm did not receive feedback from the NYDA and opined that the service is not readily available when needed:

I've only heard of a grant from the NYDA, they gave me an application form, which I submitted. The application offers information activities that they can provide to SMEs. The application comes through or it does not, but you wait forever. So, for me that does not really count.

As such, overdraft loans, personal savings, and partner's investments are the different methods used by the eight case studies to fund their e-business and related adoption costs. "It was personal savings, and then a partner that offered a particular investment in the business. That's how we financed the business". All eight case studies strongly emphasised the support from their spouses. However, one small firm in SA opined that without the support of the spouse, the business would have been long bankrupt. Put simply, the adoption and success of small firms' e-business is highly dependent on their respective family support system, much more than government support. The support from family is usually related to the organisational context of TOE, in particular to financial readiness, but is also significant to the direct successful adoption of e-business. For example:

My husband is the main bread winner of the family, I was not taking a salary from the business as the focus was to grow the business until such time it was financial healthy to take a salary for myself. However, had I been the sole or main bread winner for family, this would not have been possible and probably went bankrupt a long time ago ... as wouldn't have earned a cost of living from the business.

Two UK small firms offered insight into the financial challenges that are specific to those that design their own collection. In particular, the costs related to the organisational context, but that rely heavily on the environmental context. For example, the cost of production is an organisational factor that impacts the e-business's adoption decision, and is dependent to some extent on the environmental context, such as banks, investors, and credit from suppliers. The issues that were raised highlighted the significance of adequate liquidity in the production aspect of the small firms' chain that directly affects e-business adoption. The perspective by the small business is that:

An aspect that was initially tricky, is deciding how to fund the business, because we had so much checklist of things. For example, laboratory testing, our insurance, quality insurance, you know all the equipment we use

and the premises as well. It was a lot of things that required funding. Initially we thought of approaching rich individuals and telling them about the business plan but that would affect our profit margins. So, we took out overdrafts. It is more like a stylish loan, to add to our money. Luckily for us, we have been able to pay back, that is why there has not been profit from the business because every money I make I just pay it back. After paying back all the money I have used, I can start making profit. So, a lot of the times in the first year of your business you don't make big profits and that's what we are experiencing right now.

5.3.4 Industry issues

Industry challenges in the e-retail sector, especially the costs associated with channel conflict and rapid product lifecycle, were revealed by three of the eight small firms that buy and sell rather than design their own collection in the UK and SA. From the four small firms in SA, three were designers of their own ranges. However, the one small firm that relied on suppliers, expressed the ravaging costs of e-business where the product has an extremely short seasonal shelf life. In particular, where there are currency differences between supplier and e-retailer. The small firm said:

One of the biggest challenges about the fashion industry is the super-fast cycle of the fashion industry. As a business, you need to have the interesting goods and be able to sell them at the shortest time possible to remain relevant and in business. Due to the lack of funds and support to keep up, this was not possible. I made plans and actioned initiatives to move away from fast fashion and diversified the product offering. I searched for locally made timeless products to offer on the website. However due to the lack of cash flow potential of this diversification was not accomplished.

The five small firms that sell their own designs revealed less concern about the product life cycle. Their concerns were rather related to industry issues related to the copyright of their designs. This is mainly because designers possess the classical life of garments within the control of the small firm. Put differently, small e-retail firms that design their own collection can maintain an infinitely ascending curve that weathers the storms of the short shelf life and seasonality of products. However, they have struggles with the copyright of their designs due to right that limits fashion designs to technical and artistic aspects unique to the designer; protection which is very expensive for a small firm without a legal muscle. Small firms expressed the following:

One of the challenges we have is other people copying my designs. They come to me asking for quote, and if it's not to their desired price, they take my design to another person to do it for them. It makes me feel helpless, but I know they can never do it to my standard.

6 Discussion

The TOE theoretical lens is highly regarded as the logical lens with solid explanatory power for studying e-business adoption at a firm level [23, 26]. However, it has been criticised for using taxonomies to categorise factors into contexts, which neglect specific information that relates to the social context of individual small firms [28, 29].

This study is an attempt to advance TOE as lens to understand small firms' adoption strategies pertaining to the various contexts, and informing e-business adoption from evidence generated from other small firms, rather than from big organisations. Specifically, using TOE to understand how small firms lower and manage the direct and complementary costs of e-business. The eight case studies revealed interesting e-business options, strategies and associated costs that inform theory and practice (see Fig. 2). In particular, how small firms orchestrate the unintegrated bundles of technological-organisational and environmental contexts to adopt e-business, as discussed below.

- Technological context

The three e-business options (website, third-party, and social media e-business portals) offer a renewed paradigm of how technology is interpreted and leveraged by small firms to lower the perceived costs of the adoption of e-business. There are three technological context e-businesses adoptions options with heterogenous strategies and direct and complementary costs. From the three, the website e-business option offers an integrated and more customised market segment-oriented approach, but at the aggregate cost of technological context that ranges from R9 224 to R17 550.00, and £1 055.00 to £1,645, in SA and the UK, respectively.

The third-party e-business option is the cheapest approach that offers an integrated e-business adoption, at a lower cost of £27 a month, but with less exclusivity to the target market.

The social media e-business is the median adoption option (R1168 or £69 a month) that reveals the transformative strength of social media and mobile phones in creating e-business opportunities and addressing social problems, such as unemployment, for those small firms with limited resources. The latter builds support for studies that explored how social media enhances electronic commerce [71].

Theoretically, the findings reveal that small firms' e-business adoption embodies a technology ecosystem that consists of third party innovators, internet service providers, developers, hosting, and social media, and these services provide an interdependent and interconnected network of technology entities that spur small firms' e-business adoption. The technology ecosystem provides better insight into the internal and external IT infrastructure taxonomies as related to TOE's technological factors within the context of small firms. Small firms orchestrate unintegrated bundles of technology ecosystems in their adoption of e-business, such as e-media (Facebook and Instagram), ISP (Sky, Vodacom, Virgin), and e-transactions (e-wallets and EFT). Beyond this orchestration of technology ecosystems in their adoption

of e-business, the small firms orchestrate the tech ecosystem to build information networks and systems that allow them to respond to customers (i.e. feedback), react to their demands and interest (i.e. social media, e-bay reviews), and gather intelligence (i.e. Etsy).

Whilst there was a common approach of integrating public and private services by the eight case studies, there were considerable differences in the eight case studies' choice of decisions and strategies. The differences revealed some of the heterogeneous strategies that exist in small firms in a homogeneous market that are necessary to understand the critical determinants of technology that are positively related to the rate of e-adoption, such as perceived advantage, compatibility, trialability, perceived barriers, perceived risks, perceived ease of use, and perceived importance of compliance. For example, the eight case studies revealed insight into the perceived advantages that can be categorised into lifestyle or circumstantial changes (such as raising a family, career changes, and economic migration), and perceived the cost of adoption of the e-business portal (i.e. market segments, network connectivity, and payment processing options), which is intertwined with the trialability of the entry to e-business. Compatibility was emphasised from the perspective of business models (i.e. nature of business, risk perception, cost of production), and the support system available to the small business (such as family, and friends). The description of compatibility is highly intertwined with perceived ease of use, compliance, and barriers.

The small firms' interpretation of perceived advantage and compatibility reframe the definition of key determinants that are positively related to e-business adoption. For example, the interpretation of perceived advantage as lifestyle, circumstantial changes, and perceived cost of e-portal adoption reflect the small firms' narrative of their own environment and practices. The latter narratives reframe the relative advantage beyond the perceived benefits that IT innovation provides to the organisation [25, 46], to include the perceived benefits that IT provides to the change in personal circumstances and lifestyle choices. Similarly, the articulation that compatibility is the degree to which innovation is compatible with past experience and existing values, as determined by previous studies [25, 46], is inconsistent with small firms' compatibility of desired product line, risk perceptions, and cost of production. Rather, it is consistent with one of the central definitive references of compatibility, such as the needs of adopters, as found in previous studies [25, 46]. Further, contrary to the findings by Yoon and George [46], the latter perceived advantage, and compatibility (intertwined with perceived ease of use and compliance) have a strong bearing on small firms' decision to adopt e-business. Looked at differently, the findings suggest that TOE's technological determinants translate differently to different firms.

- Organisational context

Whilst the technological context revealed heterogeneity, similar approaches in both the UK and SA were observed with relation to the organisational and environmental context. In particular, the complementary nature of the environmental context in mitigating against the weaknesses of the organisational context in the adoption of

e-business. For example, bank services (e-wallets and EFT), distribution services (Royal Mail, POSTNET, Aramex), and private companies' IT infrastructure and services are environmental cost factors that mitigate against organisational context factors, such as the lack of dedicated delivery vans, and integrated e-business platform.

In practice, the option exemplified how small firms with limited resources orchestrate unintegrated bundles of e-media (Facebook and Instagram) and e-transactions (e-wallets and EFT) to adopt e-business at an extremely low cost. The findings support scholars who commonly point to intelligent and critical soft skills, such as the ability to learn, reason, and listen, and good communication and logical thinking skills, as a good complement for the changing employment paradigm shift [78–80]. Undoubtedly, small firms' qualifications in engineering, economics, marketing, corporate governance and finance, and environmental studies laid the foundation for some of their analytical skills and versatility. This applies especially to those with economics, business and marketing qualifications, as they are transferable to the e-business environment.

As such, the study found organisational costs to be lower across all eight case studies, with an aggregate of R100 to R700 and £60 to £680 in SA and the UK, respectively. This leads to the conclusion that cost barriers are most prevalent in the technological context, rather than the organisation and environmental contexts. Put simply, the three types of e-business adoption offer interesting insight into the interaction of TOE theoretical constructs in strengthening the weaknesses inherent in the respective contexts. Of interest, was the idiosyncratic nature of the eight case studies in terms of the varying dependency on family, interpersonal relationships, management approach and funding of e-business and assorted adoption costs in both countries. Also, support derived from the organisational context, such as family and friends, complement environmental context factors, such as the lack of IT/IS expert knowledge. The dependency reveals an interpersonal ecosystem that extends TOE's organisational factors from size, scope, managerial structure, proactive technical orientation, and financial readiness to include friends, family, and spouses. Looked at differently, small firms' e-business adoption is the sum of unified cooperating interpersonal teams or ecosystem. The interpersonal ecosystem serves as financial sponsors, cross-pollinators of knowledge, staff complements, and breadwinners that allow the owners of small firms an incubation period in which to experiment and grow the business without the constraints of physiological (i.e. food, shelter, clothing, reproduction) and safety needs (personal security, insurance, legal matters). The dependency on family that existed within e-business small retail firms were in terms of business funding, marketing, and staffing.

- Environmental context

The environmental context of the eight case studies builds support for studies that consider the infrastructural development of a country, such as the robust supply and distribution of e-commerce goods, IT infrastructure and services, as key determinants of the e-business adoption and success for small firms [49, 72]. The infrastructure, which falls within the ambit of the environmental context emanates from different unrelated industries (or an industrial ecosystem) that complement the internal

needs and financial resources of small firms (which are in the organisational context). The latter industry ecosystem extends the initial contextualising of the TOE environmental factors beyond a network of entities in the same industry (clothing retail) to include a network of entities outside the industry, such as logistics companies (i.e. Royal mail, Aramex, POSTNET, etc.), banking services, and payment innovations (HSBC, PayPal, Yoco), and some government services. These networks of business entities serve as critical dependent services that support small firms' e-business adoption.

To some extent, the findings are in accordance with those of Oliveira and Martins [38] that considered the characteristics of the industry as the most important factor of e-business adoption in Europe. The characteristics of industry in terms of the nature of the product (clothing) that can be easily distributed using existing courier systems with less risk of damage to the end-user, and which is adjustable to different e-business options, such as third-party and social media portals, appears to be more compatible with clothing retail. The practice would be impossible for e-grocery retail [73, 81].

However, there are varying degrees of significance related to the specific country in e-business adoption. For example, the government provides very little support to small firms in SA, whilst providing some degree of training and information to small firms in the UK. As such, the findings related to SA small firms contradict the findings of Jeon et al. [51], who found that the country in which the firm operates is a determining factor of e-business adoption. Jeon et al. [51], however, finds support in that to some degree there is government support in terms of information and dealing with legal issues to small firms in the UK. Whilst this assertion is quite insightful in considering e-business adoption factors from the Korean and European perspectives, it serves as evidence of the underlying idiosyncratic nature of the environment of small firms.

The TOE e-business strategy presented in Fig. 3 provides insight into how small firms manage direct and complementary costs, and strategies in use for e-business adoption decisions by small firms. The costs listed under the eight case studies represent the actual costs of adoption, including the strategies used to lower the costs barrier. Below follows a concluding section that points towards the theoretical, practical, and methodological implications of the current study, including practical directions for future research on the cost of e-adoption.

7 Conclusion and recommendations

The aim of the study which this paper reports on, was to use TOE as a lens to present empirical evidence of the direct and complementary costs of e-business adoption, whilst highlighting effective adoption strategies in use, and comparing the cost of adoption between developing and developed economies through eight micro-business case studies. Previous studies that acknowledged the cost barrier to e-business adoption neglected to specify the accurate figure of such costs and only offered speculative narratives of costs per TOE context. In particular, information about

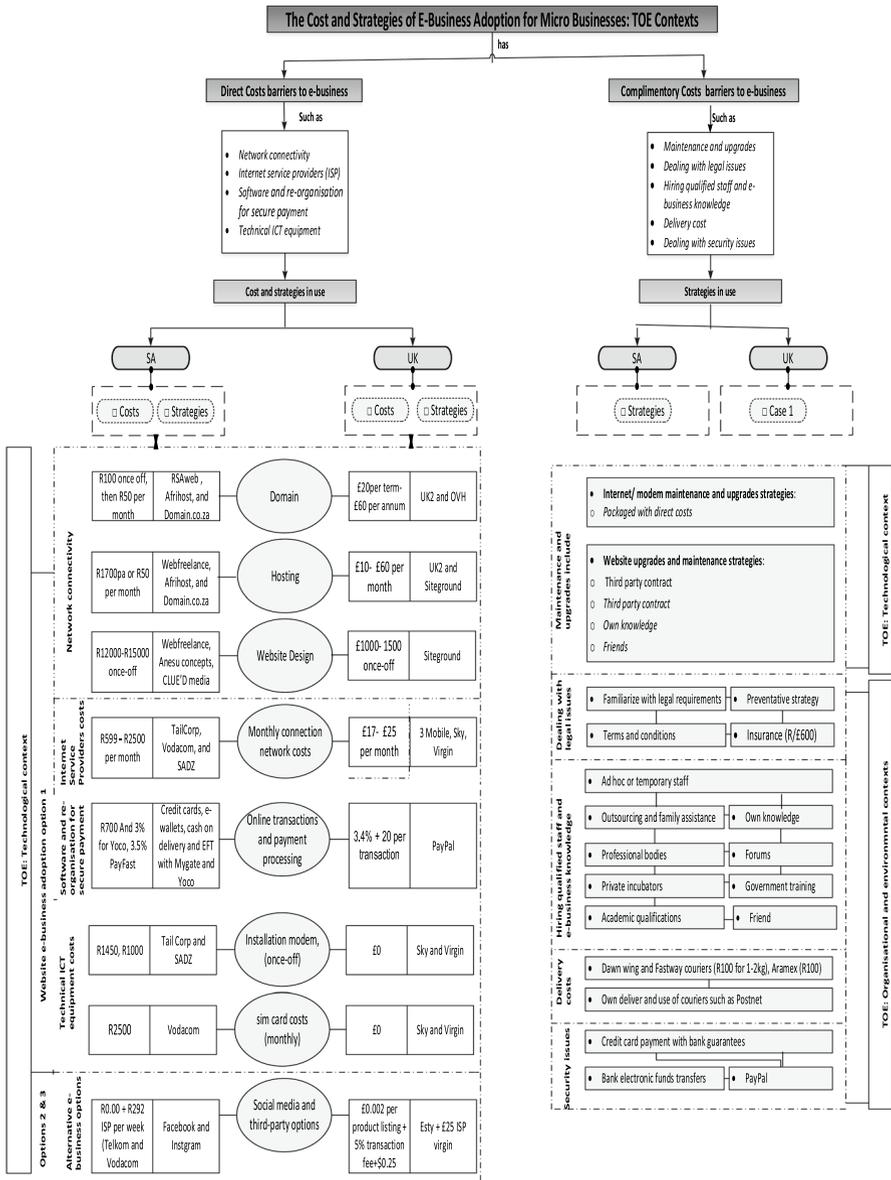


Fig. 3 TOE e-business adoption strategies and costs. *Notes* Year of e-business adoption for the case studies: social media 2014, third party 2019, Website adoption (UK cases: 2008, 2010, and 2020; SA cases: 2013, 2012, and 2019)

less expensive strategies seemed dispersed; hence, making it difficult for microbusinesses to understand the e-business adoption decision.

With the complicated, expensive and risky strategies continually discouraging microbusinesses from integrating and adopting e-business, the study presented a TOE strategy that highlighted the integration processes through cost-lowering collaborations with government agencies and contracting public-private services. For small firms in SA, the aggregate costs of fixed, plus variable costs related to e-business adoption across TOE contexts is R292 (social media), and R9 924, R17 150 and R17 650.00 for the three website options.

In the UK, small retail firms can consider the TOE context of e-business adoption for £27 (third-party per ten products), and £1,055.00 to £1,705 (website e-business option). Using a £1=R17 currency convention rate [68], the direct costs of e-business adoption are higher in the UK than in SA (i.e., R17 650/17=£1038, which is <£1705). The difference in pounds currency was £667 (R11 339).

The varied costs of adoption represent the idiosyncratic nature of smalls firms, and the heterogeneous strategies adopted to reflect the different needs, resources and social context (varied support system from family and friends) of the eight small firms. For example, some costs are higher due to the legal and insurance cover of small firms. Interestingly, the third-party e-business adoption option at £27 per month is the cheapest and most integrated package, if compared to the social media e-business adoption at £69 per month, with exceptions to advertisement. However, the advantage of social media is the unlimited listing of clothing range, which in turn, makes the comparison debatable.

In minimising the cost barriers related to e-business adoption, the current study observed an effect of simultaneously lowering the majority of other recognised e-business adoption barriers that can be applied to small firms across the TOE context. This is due to the correlation between the cost barrier elements of e-business adoptions and the 'other' barriers of e-business adoption. For example, addressing the technological context cost barrier of software and re-organisation [34] through the use of PayPal, Yoco, Pay Fast and EFT, simultaneously reduces the environmental context complementary costs of dealing with legal and security issues. The same observation was made in that dealing with security issues and having known payment processing methods reduce the 'other' barriers to e-business adoption related to the issue of trust and privacy barriers identified by the OECD [34], which is observed outside the parameter of costs [10]. The latter reinforces findings that third-party security, trust, and reputation influence online transactions [74]. The insights gathered from the case studies could serve as awareness for other small firms, and also fill some of the theoretical gaps related to services and ways of adopting e-business at a lower cost.

- Practical contribution

In practice, the study revealed the actual cost and strategies of e-business adoption by small retail firms in the UK and SA. An understanding of the actual cost is useful to the owners of small firms and to government bodies with a mandate of advancing small firms. It also highlights the idiosyncratic nature of small firms, such as family dependency on funding for business and staffing, interpersonal technical support

from friends, management approaches from mentors, incubators and government support.

While the findings are limited to two geographical contexts and a single clothing retail market, its practicality can be easily transferred to other geographies and markets. Hence, the recommendation for future research in transferring the model to other retail markets and geographies. The findings can also provide policy-makers and government support services with better e-business adoption information about the issues that affect SMEs.

- Methodological contribution

Methodologically, most previous studies pursued the e-business adoption of small firms using a survey, which neglected the idiosyncratic nature of small firms. Pollard and Morales [31] deem the generalisation approach associated with a survey as inadequate for small firms with high heterogeneous contexts. In using the case study approach, this study offers an in-depth understanding of a cost-effective e-business adoption model that is tailored for small firms in a particular context, whilst paving a way towards understanding the heterogeneity that exists within small firms and in different contexts. Future research could compare the idiosyncratic nature of small clothing retailers observed in this study to other small retail segments or markets.

- Theoretical contribution

Theoretically, the study followed Pollard and Morales' [31] advice to approach the small firms' environment, and inform theory from their practice as well as evidence generated from other small firms. The findings reveal that small firms' e-business adoption embodies an ecosystem environment approach which can better extend/amplify TOE's theoretical lenses. Three types of ecosystems were identified, namely technology (techno ecosystem), interpersonal ecosystem, and industry ecosystem.

The technology ecosystem reflected in all eight case studies consists of third-party innovators, internet service providers, developers, hosting, and social media, and it was found that their services provide an interdependent and interconnected network of technology entities that spur small firms' e-business adoption. Small firms orchestrate unintegrated bundles of technology ecosystems in their adoption of e-business, for example, e-media (Facebook and Instagram), ISP (Sky, Vodacom, Virgin) and e-transactions (e-wallets and EFT). The technology ecosystem provides insight into the internal and external IT infrastructure of TOE's technological factors within the context of small firms. In particular, how the technology ecosystem is leveraged by small firms to generate theoretical insight, transform e-business adoption. The theoretical insight simultaneously address some of TOE's critics that it uses taxonomies, which neglects specific information that relates to the social context [28, 29].

Another important finding that extend TOE's technological factors is related to the different interpretations of the key attributes or characteristics that are considered critical determinants for, and are positively related to e-business adoption within small firms' context. For example, small firms' perceived advantages

are categorised into lifestyle or circumstantial changes (such as raising a family, career changes, and economic migration), and the perceived cost of the adoption of the e-business portal (i.e. market segments, network connectivity, and payment processing options). Hence, compatibility was emphasised from the perspective of business models (i.e. nature of business/products, risk perception, cost of production), and the support system available to the small business (such as family, and friends). The latter narratives reframe the relative advantage beyond the perceived benefits that IT innovation provides to the organisation [25, 46], to include the perceived benefits that IT provides to the change in personal circumstances and lifestyle choices. Similarly, the interpretation of compatibility as the degree to which e-business is compatible with the desired product line, risk perceptions, and cost of production supports mainly the needs of adopters, much more than the factors of past experience and existing values, as was articulated by previous studies [25, 46].

The interpersonal ecosystem extends TOE's organisational factors from including size, scope, managerial structure, proactive technical orientation, and financial readiness, to include friends, family, and spouses. Looked at differently, small firms' e-business adoption is the sum of the unified interaction and cooperation of interpersonal teams or the ecosystem. The interpersonal ecosystem serves as financial sponsors, cross-pollinators of knowledge, staff complements, and breadwinners that allow small firms' owners an incubation period in which to experiment and grow the business without the constraints of physiological (i.e. food, shelter, clothing, reproduction) and safety needs (personal security, insurance, legal matters).

It is evident how the interaction between the small firms, and the technology-, interpersonal-, and industry ecosystems generate a multifaceted cognitive dimension of e-business competence. Particular evident is how the technology, social, and industry encounters of e-business converge, creating critical soft skills, such as the ability to learn trends and intelligence that transforms small firms' ability to adapt in the digital market. All eight small firms interviewed possess no IT or e-business related qualifications, but demonstrate the competence to update their web pages, analyse other competitors, observe sales statistics from different portals, and orchestrate different technologies and social media platforms to lower the costs and increase visibility. The latter e-business competence displayed by small firms builds support for some of the characteristics and principles of connective learning, such as curiosity [82], wayfinding, sense-making, and operation interaction and innova-tion interaction, as observed in open and connected digital environment by previous studies [83]. Like other studies in connective learning [83], and curiosity [82], the different approaches used by small firms to permeate e-business explain how cognitive development evolves across TOE's theoretical environments.

Industry ecosystem extends the initial contextualising of TOE's environmental factors beyond a network of entities in the same industry (i.e. clothing retail) to include a network of entities outside the industry, such as logistics companies (i.e. Royal mail, Aramex, POSTNET etc.), banking services and payment innovations (HSBC, PayPal, Yoco), and some government services. These networks of business entities serve as critical dependent services that support small firms' e-business

adoption. Looked at differently, the findings suggest that TOE's environmental factors are viewed differently by different firms.

Harmonising the three ecosystems and incorporating them into TOE's theoretical framework generates insights that are crucial for small firms' e-business adoption. The use of TOE as an approach to explore small firms' e-business adoption, including the direct and complementary costs and strategies, is an attempt to address the gap caused by a lack of conclusiveness and suitability of an independent or combined theory for a decision on SME e-business adoption, as identified by Parker and Castleman [35]. Future research could apply the strategy proposed by this study to offer a better reflection in terms of the position of conclusiveness and suitability of the strategy as related to an SME's e-business adoption decision.

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