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The Impact of eReadiness on eCommerce Success in Developing Countries: *Firm-Level Evidence*

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Firm-Level Evidence

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Abstract

This paper explores the organisational and environmental "e-readiness" variables that might affect e-commerce success in developing countries. Data are extracted from a survey of business organisations conducted in South Africa. Cluster, discriminant function and canonical correlation analysis are used to analyse the data. The results indicate that – contrary to the conventionally-accepted perception that treats environmental factors as major barriers to e-commerce in developing countries – firm-specific variables appear to be the key drivers in differentiating relatively successful from less successful businesses.

In particular, the technological resources of businesses, the governance model they put in place, and their commitment appear to be playing significant roles in affecting successful development of e-commerce and its benefits in terms of communications improvement, cost saving and market performance. The implication is that businesses in developing countries that excel in these three areas are likely to achieve greater e-commerce success. However, because any sustained advantage is context-specific (that is, there are no universal sources of advantages), the importance of other organisational and environmental contextual variables should not be ignored.

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Introduction

The objective of this paper is to investigate the impact of "e-readiness" on e-commerce success through a firm-level analysis. The paper also attempts to identify the e-readiness variables that significantly discriminate between organisations that achieve greater e-commerce success from those that do not.

The e-readiness, however defined, of developing countries has attracted a lot of research and practitioner interest (for detailed discussion, see Bridges, 2002; Choucri et al, 2003; Molla, 2002). However, some limitations could still be noted:

- First, most of the e-readiness studies in developing countries focus on national-level indicators. These studies are helpful in highlighting the legal, financial, physical, social and technological infrastructure limitations that businesses in developing countries need to transcend in order to implement e-commerce. However, they have limited power in explaining how and what level of infrastructure development affects individual businesses' decisions to undertake e-commerce and the success of such endeavours.
- Second, because the emphasis of these studies tends to be on producing indices and general set of requirements, the needs of specific sectors, business organisations and e-commerce applications remain largely unknown.
- Third, while the notion that the e-readiness of a country affects e-commerce success is intuitively appealing, there are no empirical studies to validate such claims. In fact, as developing countries continue to address some of the infrastructure barriers, firm- and market-specific issues need proper investigation to identify the real barriers and drivers of e-commerce and its success.
- Fourth, existing e-readiness studies lack clear theoretical foundation.

Overall, what is missing from the existing literature is (1) a theoretical framework of e-readiness and e-commerce success relevant to firms in developing countries, and (2) a firm-level empirical assessment that explicates such relationships. This paper aims to address these gaps.

A. Research Framework

Using a theoretically-eclectic approach drawn from innovation literature, socio-technical, resource-based and competitive context theories, a framework of e-readiness and e-commerce success has been proposed with particular attention to organisations in developing countries. The framework is discussed elsewhere in Molla (2002) and Molla and Licker (2002). The framework articulates e-readiness as a two-dimensional concept representing organisational and external e-readiness constructs.

Organisational e-readiness is operationalised using six variables, i.e. awareness[1], commitment, human resources, business resources, technological resources, and governance. External e-readiness is evaluated as managers' perception of market forces e-readiness, supporting industries' e-readiness, and government's e-readiness. eCommerce success, on the other hand, is measured in terms of the success of the development process (that is whether e-

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[1] Because conceptually, awareness is a factor that affects adoption (intention to adopt) and because success can only be evaluated once adoption takes place, this particular variable is excluded from the analysis in this paper.

commerce projects are completed on time and within budget), benefits from e-commerce implementation, and overall satisfaction with e-commerce implementation. Figure 1 captures a visual impression of the framework and Table 1 provides a summary of the definitions of the research variables.

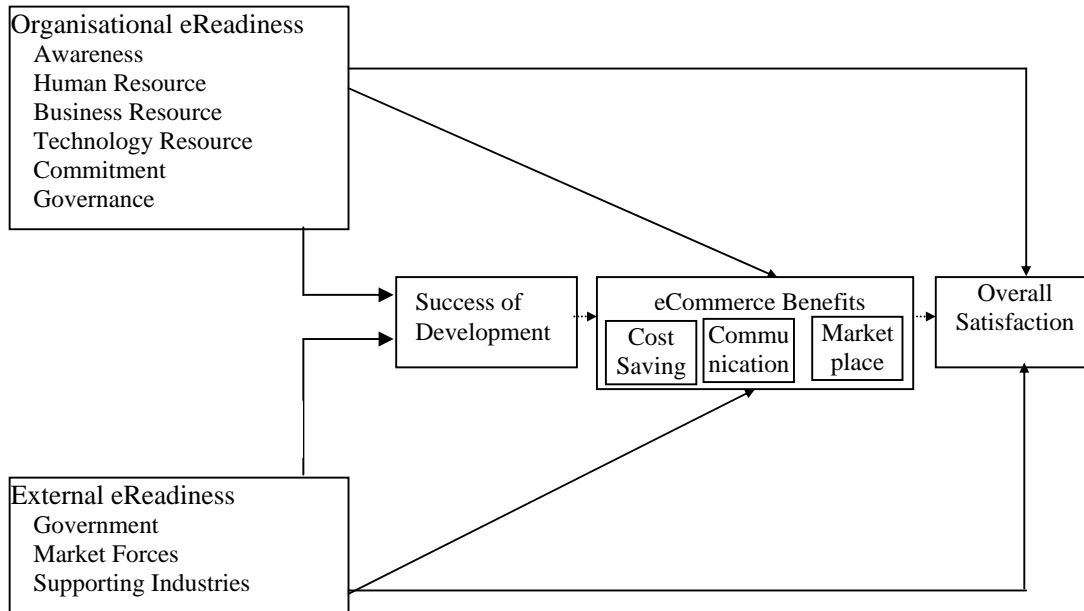**Figure 1: A Framework of eReadiness and eCommerce Success**

Table 1: Definition of Research Variables

	Variables	Description
Organisational eReadiness	Commitment	Reflects enough energy and support for e-commerce from all corners of an organisation and especially from the strategic apex. It refers to having a clear-cut e-commerce vision and strategy championed by top management, e-commerce leadership, and organisation-wide support of e-commerce ideas and projects.
	Human Resources	Refers to the availability (accessibility) of employees with adequate experience and exposure to information and communications technology (ICT) and other skills (such as marketing, business strategy) that are needed to adequately staff e-commerce initiatives and projects.
	Technological Resources	Refers to the ICT base of an organisation and assesses the extent of computerisation, the flexibility of existing systems, and experience with network-based applications.
	Business Resources	This covers a wide range of capabilities and most of the intangible assets of an organisation. It includes the openness of organisational communication, risk-taking behaviour, existing business relationships, and funding to finance e-commerce projects.
	Governance	The strategic, tactical and operational model organisations in developing countries put in place to govern their business activities and e-commerce initiatives.
External eReadiness	Government eReadiness	Organisations' assessment of the preparation of the nation state in terms of government commitment and the legal infrastructure to promote, support, facilitate and regulate e-commerce and its various requirements.
	Market Forces eReadiness	The assessment that an organisation's business partners such as customers and suppliers allow electronic conduct of business.
	Supporting Industries eReadiness	Refers to the assessment of the presence, development, service level and cost structure of support-giving institutions such as telecommunications, financial, trust enablers, and the IT industry, whose activities might affect the e-commerce initiatives of businesses in developing countries.
eCommerce Success	Success of Development	This is an assessment of whether or not e-commerce projects have been completed within budget and time.
	Cost Saving	Cost reduction in terms of operation and marketing costs including personnel, rent, order, payment processing, interactions and managing customer information and bypassing intermediaries.
	Communications Improvement	Improved internal communication and inter-organisational communication.
	Marketplace Performance	Extending firms reach, product/service differentiation, increased customer loyalty and improved customer relationship.
	Overall Satisfaction	Overall satisfaction with e-commerce applications.

B. Notes on Research Methods

The data reported in this paper are extracted from a survey conducted during late 2001 and early 2002 in South Africa. The instrument used to collect the data has passed through rigorous content, construct, convergent and discriminant validity, readability and reliability tests. The final instrument has 48 items with a Cronbach alpha reliability of 0.94. That is: 26 items for measuring the organisational e-readiness with a Cronbach alpha of 0.93; 10 items for external e-readiness with a Cronbach alpha of 0.79; 11 items for assessing e-commerce success with a Cronbach alpha of 0.83; and one item for capturing the degree of overall e-commerce satisfaction.

Respondents were asked to express their degree of agreement on a five-point Likert-type scale ranging from 1 (strongly agree) to 5 (strongly disagree). The questionnaire survey solicited data from 150 business organisations. 64% of the respondents were managing directors or their equivalent; the rest were directors of finance, e-commerce and information technology. Further demographic details of the survey are discussed in Molla and Licker (2004).

Out of the 150 respondents, 92 were found to be performing some form of e-commerce, which in our case was conceptualised as having a Web-enabled system that at least allows some interaction with customers, suppliers and other business partners. Therefore, the analysis below proceeds with 92 data sets. Data are analysed using cluster, discriminant function and canonical correlation analysis.

C. Analysis and Findings

A cluster analysis was used to divide the 92 businesses into two categories based on their e-commerce success profile. This has resulted in a relatively more-successful and a relatively less-successful sub-sample. The first group contains 57 businesses and the second 35 businesses. Figure 2 captures this.

Figure 2: Two-Cluster eCommerce Success Profile
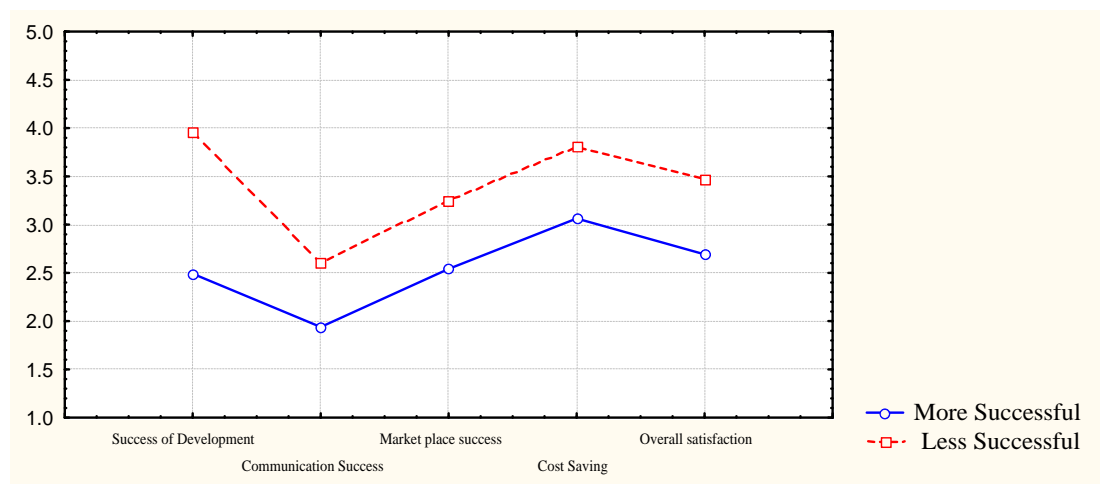
Examination of Figure 2 reveals that both "more successful" and "less successful" businesses appear to report major e-commerce gains in terms of improvements in internal and external communication. On the other hand, cost-saving benefit is least experienced. In addition, e-commerce projects appear not to be delivered on time and budget in a significant number of cases, and the businesses are not generally highly satisfied by the overall performance of their e-commerce implementations.

The e-readiness profile of the relatively more-successful and les- successful businesses is plotted in Figure 3. The profile indicates that on all measures of e-readiness, the relatively more-successful group demonstrates a better profile of e-readiness. This provides preliminary support to our framework notion that e-readiness has some influence on e-commerce success.

Figure 3: Two-Cluster eReadiness Profile
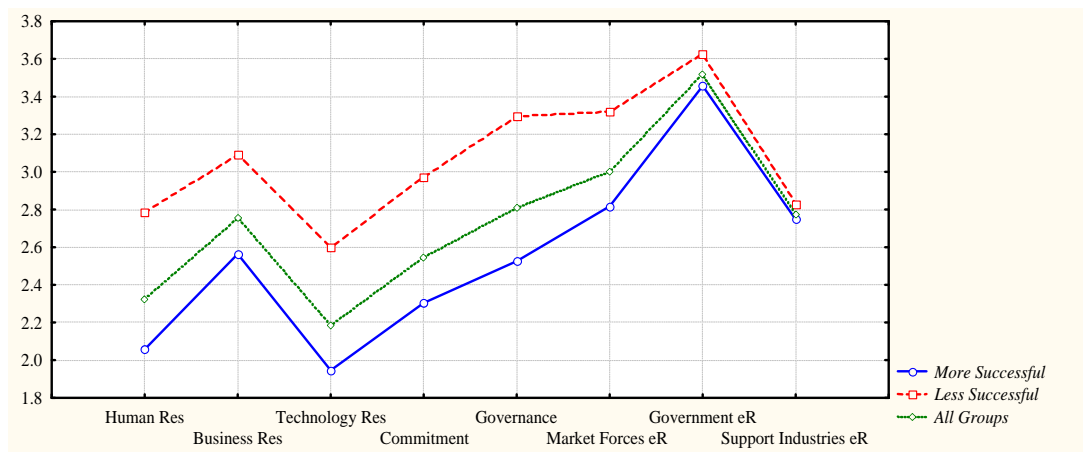
C1. Statistical Testing

A discriminant function analysis was performed to identify the e-readiness variables that discriminate between the "relatively more-successful" and "relatively less-successful" businesses in the sample. This is consistent with Hair et al's (1995) recommendation of creating a dichotomy from interval measurements in order to use discriminant analysis. The discriminant analysis produced a statistically significant function (*Wilk's lambda= 0.70; χ2= 27.79; df = 2; F= 16.66 p<0.0000*).

The accuracy of the function is checked through the hit ratio of the classification matrix and the Mahalanobis distance; that is, the distance between the two groups. Accordingly, the function correctly classifies 73% of the businesses (74% relatively more-successful and 73% relatively less-successful). The Mahalanobis distance between the groups is 11, which is high enough to further support the validity of the function.

The discriminant loading was observed to identify the variables that contribute significantly to the derived function (Hair et al, 1995). This resulted in *governance and technological resources* as the two variables with significant factor loading. Therefore, it can be concluded that these variables allow discrimination of relatively more-successful from less-successful businesses. However, because the two clusters are the artefacts of the study (constructed for

the purposes of analysis) rather than naturally occurring groups, the interpretation of this result has to be cautioned.

In order to identify the impact of the e-readiness variables on the success of e-commerce development, benefits and satisfaction we used canonical correlation analysis (CCA). CCA is a highly-recommended technique where a research model depicts a set of multiple criterion (dependent) and multiple predictor (independent) variables (Hair et al, 1995). Our analysis of the data extracted five functions (equal to the number of variables in the dependent variables set). The overall result (*Canonical R=0.87568; $\chi^2(45)=120.816$; p=0.00839*) reveals that the entire model is statistically significant.

Three of the five functions are considered for interpretation. These functions were selected because the magnitude of the canonical root (R^2) and the redundancy index are within the acceptable range (Hair et al, 1995). Using canonical loading, the following variables are identified as significantly related in each of the three functions:

- Function 1: governance, success of development, technology resource, marketplace benefits, commitment, human resources and business resources (in descending order of canonical loading).
- Function 2: Supporting industries e-readiness, communication improvement, cost-saving benefit, market forces and business resources.
- Function 3: Overall satisfaction, government e-readiness.

D. Discussion

D1. Success of eCommerce Development

This study hypothesised that e-readiness factors explain differences in the success of e-commerce development. Success of e-commerce development was operationalised using two conventional measures; that is, whether e-commerce projects were completed within budget and within schedule or not. The profile analysis reveals that, overall, there is a perception that e-commerce projects were not delivered on time and within budget. It is therefore interesting to find out: first if there is a relationship between e-readiness and success of e-commerce development, and second the factors that are responsible for such a relationship. This is of high importance to developing countries where the IT literature indicates that many projects end in some sort of failure (Heeks and Bhatnagar, 1999).

The finding reveals that some 41% of the variation in the success of e-commerce development is explained by organisational e-readiness factors. Previous studies indicate that management and organisational factors bear a strong influence on successful IT implementations (Ewusi-Mensah and Przasnyski, 1991; Jarvenpaa and Leidner, 1998). In the same vein, the finding in this study shows that e-commerce projects are likely to succeed where there are good governance models, executive-level championship, and e-commerce-complimentary human, technical and business resources. This conforms to what Keen (in Powell and Dent-Micallef, 1997) refers to as the "fusion" perspective, which indicates success of e-commerce development based on a fusion of human, business and technology resources, with management commitment and governance producing the best results.

Governance issues are not mere project management issues. Rather, they set the "critical parameters in which effective project management can take place" (Willcocks and Griffiths, 1997:228). The result in the current study suggests that organisations are likely to attain success of e-commerce development where managers understand the magnitude of the required organisational changes and prepare for dealing with these changes adroitly. This involves, *inter alia*, defining roles, responsibilities and accountabilities related to e-commerce initiatives and delegating the authority – but without withdrawing top management support – for those responsible for making decisions related to e-commerce.

In developing countries, because of a strong sense of hierarchical relationships (UNCTAD, 2001; Vreede et al, 1999), the extent to which top management is involved and champions e-commerce developments would have significant impact on the outcome. Our finding indicates that e-commerce projects supported and championed by top management are likely to be successful. That is, championship builds momentum throughout the organisation and channels appropriate resources. Although this has been reported in previous studies, it is important to stress that senior management commitment, despite its significance, might not necessarily produce the best result unless supported by the readiness of the entire organisation to buy-into the ideas of moving into e-commerce and to show support. In addition, sustaining initial commitment is a crucial issue because initial commitment is of limited value if managers withdraw their support at a latter stage, as most of them in developing countries have been found to be doing (Galleries et al, 1998; Munene, 1995; Vreede et al 1999). The key lesson here is that managers in developing countries require a shift from the "ignore" and "isolate" approaches (Heeks, 1998) that they commonly maintain towards IT projects. Instead, they need to get involved actively.

Although one would expect external e-readiness factors related to support industries to have some impact on the successful completion of e-commerce projects our result does not appear to support such influence. This could be explained because of the relatively affluent nature of the South African IT industry.

Finally, e-commerce implementation is neither a single process nor a single project. Rather it encapsulates a series of stages or projects, for which different driving forces may trigger the initiative. Therefore, further studies are recommended to extend the work described here to include the impact of e-readiness on different applications and stages of e-commerce implementation.

D2. eCommerce Benefits

An interesting relationship has been observed between e-readiness and e-commerce benefits: communication improvement, cost-saving benefits and marketplace benefits. While organisational e-readiness factors significantly affect marketplace benefits, external e-readiness forces influence communication improvement and cost-saving benefits. However, the correlation among the dependent variables hints at the existence of a strong relationship that future research might explore further.

Four items (extending firms reach, product/service differentiation, increased customer loyalty, and improved customer relationship) operationalise marketplace benefits. The result here indicates that these benefits are influenced by the e-commerce governance model organisations put in place, by senior management commitment, and by human, business and technological resources of the organisation.

Governance and commitment variables, in particular, emerge as chief factors contributing to marketplace benefits. Organisations might significantly differ in the way they govern their e-commerce activities. Such differences in management might lead to differences in the sophistication of e-commerce implementations. This eventually will lead to differences in competitive and economic benefits of e-commerce activities. While we submit to the fact that there might not be one best way of governing e-commerce activities, it is also possible, based on the findings of the study, to highlight some issues.

Organisations that repudiate traditional hierarchies and relinquish e-commerce decision-making authority (as captured through the items that operationalise governance) to those that are best placed to make such decisions appear to progress well on the path of e-commerce and obtain relatively better marketplace benefits from their e-commerce investments. Hence, benefits of e-commerce for developing countries might not easily materialise unless organisations are ready to adjust their styles of management and communication. This is consistent to what UNCTAD articulated in its 2001 eCommerce and Development Report, which reads:

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" the potential of e-commerce to become an engine of development will
not be realized if investment in infrastructure, equipment and human
resource development does not go hand in hand with profound
modifications in the organization and management of companies.
Fundamental changes need to be made, in particular in assigning
authority and responsibility in public and private organizational
structures" (UNCTAD, 2001)
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Organisations that cultivate broad-based buy-in of e-commerce throughout the organisation and that communicate their vision and goals as well as the extent and impact of changes to all their employees appear to be performing well. On the other hand, e-commerce might perform poorly in the absence of integration with other systems of the organisation. This will definitely be a challenge for most of the organisations in developing countries that are grappling to "automate" and "informate" even their basic applications.

Human, business and technological resources contribute to marketplace benefits. This is consistent with the tenets of resource-based theory whereby the routines, processes, skills and other resources organisations build give them a competitive advantage in the marketplace (April and Cradock, 2000). Organisations' ability to maintain and manage their relationships with suppliers, customers and other partners occupy a central role in e-commerce. The finding in this regard reveals that building and maintaining trusting and economically-viable relationships and leveraging those relationships using e-commerce applications could contribute significantly towards ensuring better market performance. This is a particular challenge to businesses in developing countries that belong to international trade chains.

External e-readiness forces have also materialised as affecting communication improvement and cost-saving benefits. In particular, market forces e-readiness and supporting industries e-readiness explain some 17% of the variations in communication improvement and cost-saving benefits. This shows the impact of network externalities and institutional forces in affecting value from e-commerce in developing countries. Therefore, e-commerce benefits to developing countries depend not only on the fusion of organisational e-readiness forces, but also on the forces of the external environment.

One of the arguments of the potential of e-commerce to developing countries is making information transfer faster, cheaper and simpler. Nevertheless, this benefit depends

considerably on the adoption of e-commerce by customers, suppliers and other partners of an organisation. Therefore, benefits related to communication go to firms whose market stakeholders are ready to conduct business electronically. This again is consistent with the tenets of network externalities in which the benefit and value of using a network depend, among other things, on the size of that network (Au and Robert, 2001; Sillince et al, 1998).

D3. Satisfaction with the Performance of eCommerce

Interestingly, dissatisfaction with the performance of e-commerce is related to dissatisfaction with government's e-readiness. However the perceived lack of government e-readiness in terms of putting in place legal and policy frameworks do not appear to materially detract from the other facets of e-commerce success. This is consistent with e-commerce development in the rest of the world including the e-commerce-savvy countries where e-commerce has flourished without the existence of specific e-commerce legislation. However, this should not by any means undermine the role governments play in facilitating, and even at times showcasing (as the literature on e-government would advocate) e-commerce implementations.

E. Conclusion

This study set out to explore the impact of e-readiness factors on e-commerce success of organisations in developing countries. Two constructs of e-readiness – organisational and external – that are likely to affect e-commerce success have been identified. The e-readiness of an organisation is captured through a manager's assessment of the firm's commitment, human resources, technological resources, business resources and governance. Likewise a manager's assessment of the e-readiness of market forces, supporting industries and the government provides an insight into external e-readiness. eCommerce success on the other hand is operationalised through successful completion of e-commerce projects; through benefits related to communications, market performance and cost savings; and through overall satisfaction.

Different organisations might demonstrate different combinations of e-readiness attributes and e-commerce success profiles. Overall, though, survey respondents demonstrated a stronger profile of human and technological resources, and a weaker profile of governance and business resources. Of all the e-readiness variables, the government's e-readiness received the lowest rating. On the other hand, the e-commerce success profile revealed that e-commerce benefits are mainly limited to communications improvement. Particularly, there appears to be a general perception that e-commerce projects are delayed and not delivered within budget. Further, cost-saving benefits have yet to materialise for firms in developing countries.

Of the external e-readiness factors, market forces and supporting industries but not government seem to have some effect on e-commerce success. This result does not completely refute the critical role played by the institutional environment set by government in creating an e-commerce-friendly environment. Indeed, there is no doubt that the future of e-commerce and consumers' confidence in e-commerce would not fully materialise without government's e-readiness to put in place supportive national legal infrastructure. However, what we can conclude here is that government e-readiness is a necessary but insufficient condition for e-commerce.

Overall, our findings chime with Hartman et al's (2000) suggestion that success in e-commerce is unlikely to come to organisations which are "conspicuously short" in any of the forces of organisational e-readiness. In particular, e-commerce governance, technology resources and commitment emerge as chief factors weighing the relationship between e-readiness and e-commerce success. This finding corresponds with findings of previous studies on IT implementations in developing countries (Boer and Walbeek, 1998; Jarvenpaa and Leidner, 1998; Montealegre, 1996; 1999) and is supported by Enns and Huff's (1999) framework for the successful implementation of IT in developing countries.

The above reveals the significant firm-level challenges that organisations in developing countries must overcome in order to secure timely and within budget delivery of e-commerce projects and extract maximum benefits from their implementation. Because most firms in developing countries materially lack such capabilities (see Jarvenpaa and Leidner, 1998; Montealegre, 1998; Odedra and Straub, 2003), organisations in developing countries in general and South Africa in particular might consider trying to excel in these three areas in order to gain competitive advantage over their main comparator firms. Nonetheless, it is important to recognise that any sustained advantage is context-specific; that is, there are no universal sources of advantages. As a result, a focus on excellence in these three areas should not allow the importance of other internal and external contexts to be ignored.

A practical question that emerges from the discussion hitherto is how much of the desired attributes of e-readiness should businesses demonstrate? Or, putting it another way, how e-ready should organisations be? Our position is that e-readiness is a shifting goalpost. The process requires continuous monitoring of organisational and environmental contexts and a capacity to routinely observe and understand organisations' e-commerce activity while simultanesously undertaking that activity. This is essential because the very organisational and environmental resources and conditions on which organisations draw in migrating to e-commerce can at the same time be the basis for shaping and reproducing the internal and external environment under which they operate

As organisations accumulate their capabilities, learn from their past experiences and interact with their environment (which in itself is in a state of change), their profile of e-readiness changes too. Especially in the age of the Internet where agility is an important business capability, it will be impractical for businesses to wait before they or their environment are "e-ready", if such a state of equilibrium can ever truly exist. Therefore, it is necessary for businesses to migrate to e-commerce (using various entry-level strategies) while at the same time working towards improving their e-readiness profile.

Finally, the study has some limitations in terms of its sample size and external validity. Ideally, a larger sample size is desirable for greater stability of the findings. Future research using a larger sample size is therefore needed to test if the results obtained here are replicable. South Africa's relatively better state of government, IT, financial and legal infrastructure compared to many developing countries might have influenced our result. Therefore, the extension of the findings documented here to other developing countries should be cautioned and requires further research. A replication of the study in other places will help shed light over interesting questions like: do the identified relationships prevail in other settings? What other relationships exist and how are they different from the patterns that emerged in this study? The model described in this study together with the instrument constitutes a contribution to guide such further studies.

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