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Abstract

In this era of globalisation, Electronic Commerce (EC) has been promoted as a tool for bridging the gap between the developed and developing countries. However, despite the promises made by various international organisations, the developing countries are encountering difficulties in realising the EC benefits. To address this issue, numerous studies have been carried out in various developing countries in an attempt to identify the keys to EC's successful adoption and diffusion in the developing countries. However, despite the significant differences between developed and developing nations, most studies carried out in developing countries employed the same study frameworks used in developed nations. This paper recognises the unique national context of the developing countries and argues that the national context factors can have significant impact upon EC adoption by organisations in developing countries. As a result, we modified the well tested Technology-Organisation-Environment framework to focus on the national context. By examining the national context together with the technological, organisational and industrial context of an organisation, it is expected that the extended framework will be able to provide a more complete picture of EC adoption in developing countries.

Keywords: Electronic Commerce; Developing Countries; National Context; Technology Adoption.

1   INTRODUCTION

Electronic Commerce (EC) is a way of conducting business transactions electronically through information and communication technologies (Iacovou, Benbasat and Dexter. 1995). It covers a wide range of business operations from the physical goods transactions over the internet to the exchanging of business documents through electronic media. As a result, EC is also referred to as e-business.

Since its theoretical inception, EC has demonstrated many operational, financial and strategic benefits in the developed nations. Its ability to automate business processes such as administration, record-keeping, communication and inventory management has proved to bring significant cost saving to the organisations (Javalgi and Ramsey 2000; Parker and Castleman 2007). The rapid dissemination of information and the networking capability of the Internet has improved flexibility and responsiveness, encouraged new and more efficient intermediaries, increased the use of outsourcing, expanded market access, reduced time to market by linking orders to production, and improved internal coordination (Ham and Atkinson 2001; Sternquist 2001). Using the internet as a medium to the global market, EC provides the business with brand new business opportunities in the forms of new supply channels and product offerings (Baliamoune-Lutz 2003). To some businesses, EC is no longer a simple tool to improve the organisational efficiency, but it has become their catalyst to the global market and growth opportunities (Martinsons 2003).

In this age of globalisation and international competition, EC has been used extensively by the developed nations to capitalise on their economic superiority and further strengthen their position in the global market. Seeing the success experienced by these early adopters, international organisations such as the World Trade Organisation (WTO) and the United Nations (UN) presented EC as a leaping-board for the developing nations to bypass their local economic weaknesses and tap directly into the vast global market and business opportunities. It is continuously promoted as a solution to the wealth and digital gap existed between the developing and developed world, bringing improvements such as better access to knowledge, information, expertise and enhanced productivity to the developing countries (Qureshi 2005; Qureshi and Davis 2007).

However, such expectations are far from the reality. Not only has EC failed to bridge the economic disparity between the developing and developed countries, but it has actually widened it. Unlike the developed countries, the developing counties' unique environment and economic conditions have prevented them from successfully deploying the EC technologies and fully realising their benefits. Their lack of sound telecommunication and transportation infrastructure impedes the diffusion of EC within the country (Baliamoune-Lutz 2003; Gibbs, Kraemer and Dedrick 2003). In addition, developing countries' unique demographic structure and labour market can also negate some of the main benefits offered by the EC technologies. Their dense urban population distribution and easy access to shopping venues significantly undermine the convenience benefit offered by EC (Martinsons 2003). The abundance of cheap labour also makes manual operations more financially attractive then investing in EC(Agarwal and Wu 2004). Other impeding factors include the lack of trust between business partners and the consequent relation-based economy where face-to-face deal makings are critical (Araujo 2005; Corbitt, Thanasankit and Yi. 2003; Martinsons 2003).

Despite the difficulties the developing countries are experiencing, EC's adoption in these countries remains to be an important topic for research. The developing countries, especially the Asian developing countries represent the largest potential market for EC. With large majority of world's population residing in this region of the world, and boosting the world's fastest population growth rate, it has a vast number of business opportunities to offer with EC being the key technology to link this new market to the world. For the developing countries themselves, EC still remains to be an important tool for them to compete with the developed nations in this era of globalisation.

Given the business potential of EC in the developing countries and their difficulties in effective EC adoption, developing countries have recently become the focus of EC study. A number of studies are carried out to examine EC adoption and diffusion from various perspectives (Baliamoune-Lutz 2003; Cooper and Zmud 1990). However, the majority of the studies are carried out with western democratic mindset which assumes a free, stable political environment, an efficient market environment and uniform cultural heritage within a single country. The national factors such as the influence of the state control and cultural diversity were not given adequate attention to reflect their impacts on EC adoption. When policy is included in the EC study (Gibbs et al. 2003; Reimers 2002; Tan and Wu 2002), the force that behind the formation of the policy – the state, is largely ignored and consequently, the state's intention to introduce these policies and its ability to support and enforce them are left unexamined.

In order to obtain a complete understanding of EC adoption and diffusion in developing countries, it is important to recognise the unique national environments of the developing countries and the imperfect market conditions EC has to operate in. The Technology-Organisation-Environment (TOE) framework by Tornatzky and Fleischer (1990) which has been widely tested and utilised in many EC studies(Iacovou et al. 1995; Kuan and Chau 2001; Zhu, Kraemer and Xu. 2002), but the national context has not well explored within this framework. Therefore, this paper aims to offer more guidance and directions in future studies in exploring EC adoption in developing countries by extending the TOE framework to explicitly consider the national context and developing theoretical propositions to address the unique characteristics of the developing countries. As argued in this paper, the national context has a major influence on other contexts and therefore, by exploring the national context, this study helps researchers and practitioners to better understand how and why factors related to technological, organisational and industrial contexts affect the EC adoption and use.

This paper first discusses the uniqueness of developing countries from a national viewpoint and investigates possible major forces behind EC adoption in the developing countries. Then a review of the TOE framework including its limitation and how the model is extended is presented, followed by a detailed explanation of the development of the theoretical propositions related to the influence of each factor within the national context. Finally, a discussion of the implications and some limitations of this study are then outlined.

2 DEVELOPING COUNTRIES AND THEIR UNIQUE NATIONAL CONTEXT

The difference in political systems is one of the major causes of EC adoption discrepancy between developed and developing countries. Unlike in developed countries where democracy is the dominating political system and the democratic constitution underlies all economic practices, few developing countries have a true democratic system in place. In fact, many developing countries are under the control of authoritarian governments, while the political environments of other newly reformed democratic states are not yet stabilised. The more centralised political power gives these governments ability to exert significant influences over the economic activities or even easily block or promote the progress of EC within that country. As a result, the governments of developing countries are an important factor to study when investigating EC in developing countries, as it underlies the environment in which the EC is operating.

The cultures of developing countries also exhibit distinct differences from that of the western world. Due to their isolation from the world and the late introduction to industrialisation, they retained very unique sets of value systems and practices that can react unexpectedly when confronted with western practices such as EC. The distinct customs, consumer preferences and business practices developed under each culture poses significant challenges to EC adoption. Some of the business practices can

even contradict the practices advocated by EC. The situation can further be complicated when some developing countries like China and Indonesia retain a large number of sub-cultures which give their particular region unique cultural features or even its own languages (Malley 2004). It is important that these cultural barriers are overcome and the diverse demands are satisfied before EC can be successfully adopted and widely used among organisations in developing countries.

Furthermore, the developing countries' national infrastructure is vastly inferior to that of the developed world due to its low levels of economic development. Systems that are taken for granted in the developed nations are usually fragmented, inaccessible or unreliable and hence inadequate in supporting EC activities in these countries(Baliamoune-Lutz 2003; Dedrick and Kraemer 2001; Gibbs et al. 2003; Jiang and Prater 2002). For various geographical, political, economical and cultural reasons, developing countries are usually unable to improve or re-establish these national infrastructures to the level that is common in the developed nations in the short term. The lack of supporting IT, telecommunication, logistics and banking will continue to be a major obstacle to EC adoption in the developing countries for years to come. The state's ability to make adequate investment to improve these infrastructures is again a major determinant of EC's future development in the developing countries.

3   TOWARDS EXTENDING THE TECHNOLOGY-ORGANISATION-ENVIRONMENT FRAMEWORK

The technology-organisation-environment (TOE) framework proposed by Tornatzky and Fleischer is one of the most widely tested and used frameworks for EC research (Tornatzky and Fleischer 1990). It adopts an institutional view of technology innovation (Rogers 1995) and pointed out that the organisational environment, external environment and the technology itself contribute to the decision of innovation adoption within an organisation (Gibbs and Kraemer 2004). The TOE framework examines EC adoption from three contextual constructs, namely, the organisational context, technological context and environmental context. The organisational context addresses the basic characteristics of the organisation, including its size, scope, managerial structures and the quality and availability of the slack resources. The environmental context reflects the environment in which the organisation is operating in, comprising factors such as competitors, trading partners and the government. The technological context investigates the internal and external technology the organisation has access to. Figure 1a depicts a simplified version of the TOE framework.

The design of the original TOE framework reflects a share of adoption decision influences among the three main constructs, each contributing to the final decision. It assumes that the environment in which the organisation operates is based on an efficient market economy where supply and demand is the only dominant forces shaping the environment. In such environment, other players such as the government will not directly interfere with the economic activities of the nation under normal circumstances in order to protect a truly market oriented economy. It is a valid assumption in a democratic environment with a mature economy. However, when the TOE framework is used to examine EC adoption in developing countries, it tends not to give sufficient emphasis and exploration of the influence of the national context on EC adoption. We observed that in many studies of EC adoption in developing countries, the frequently cited factors affecting the low rate of EC adoption are related to the lack of organisations readiness and their negative perception towards the technologies which are very much shaped by conditions at the national context including the culture, the language spoken, the economic condition, the nation wide infrastructure and so on. Such generic findings related to barriers to EC adoption in developing countries are not very useful in establishing policies and guidelines for promoting the growth of EC in developing countries. In order to better understand the phenomenon related to EC adoption by organisations in developing countries, exploring the national context is therefore necessary. Such an understanding can help identify various conditions of developing countries based on their national context which in turn enables researchers and

practitioners to better understand why and how EC is being adopted and devise appropriate strategies to promote the growth of EC in each particular case.
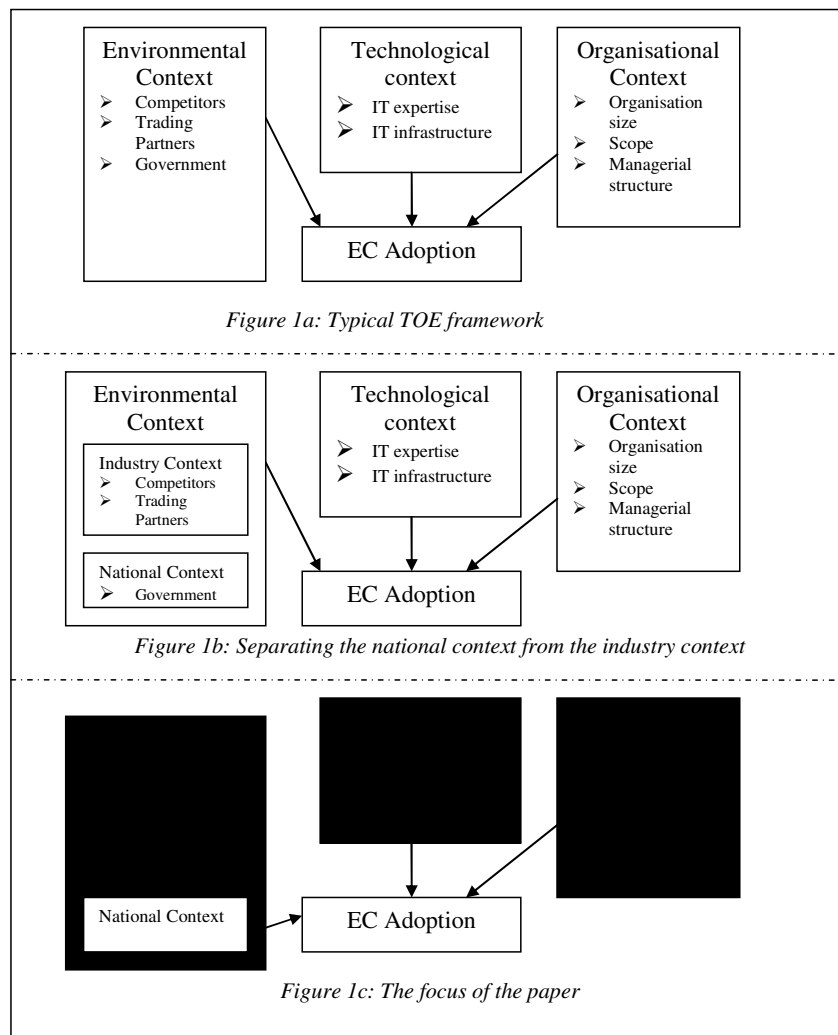

Figure 1a: Typical TOE framework

Figure 1b: Separating the national context from the industry context

Figure 1c: The focus of the paper

Figure 1:   Towards the development of the extended TOE framework

Figure 1 presents the overall idea behind how the TOE framework is extended in this study. Figure 1a shows the typical TOE framework, consisting of technological, organisational and environmental contexts. As discussed earlier, at the national level, the developing countries are fundamentally different from the developed nations in terms of its power balance within the country, the drivers of the economic activities and other cultural related issues, which are issues under the environmental context of the TOE framework. However, because of the importance of the national context in shaping the conditions in other contexts, we argue that the national context needs to be better addressed in EC adoption studies and therefore have separated the national context from the immediate environment of the adopting organisation, which is the industry context. This is shown in Figure 1b. The industrial context addresses the immediate environmental factors at the industry level, including factors related to competitors and trading partners' EC readiness, which like technological and organisational contexts, have been well addressed in many EC adoption in developing country studies (Gatignon and Robertson 1993; Vatanasakdakul and Tibben 2004). Therefore, this study focuses only on the national context, as shown in Figure 1c, which arguably has received less attention compared to other contexts.

Focusing on the national context, a theoretical model which is expressed in a number of propositions related to the influence of various factors at the national level on EC adoption is then developed and discussed in the next section. The model is expected to provide a more complete picture of the phenomenon behind the EC adoption and diffusion in the developing countries.

4 THE THEORETICAL MODEL OF THE NATIONAL CONTEXT

4.1 The development

In order to better reflect the unique national factors of the developing countries, three dimensions of the national context are proposed based on the three main characteristics of the developing nations discussed earlier. The culture, state and infrastructure aspects of the nation constitute the main focus of the national context in this study. These study dimensions are selected due to their widely recognised impact on managerial practices and organisational operations in this era of global expansion (Ghemawat 2001; Tan, Tyler and Manica 2007). They underline the business approaches organisations employ in one specific country and dictate the formulation of business strategies. Due to their significant influences on the foundations of business practices, it is therefore logical to include these dimensions in the national context of IT adoption studies.

Under each dimension, detailed factors of study were determined based on the results of previous empirical EC studies and theoretical propositions (Bajaj and Leonard 2004; Baliamoune-Lutz 2003; Parente and Prescott 1994). Given the enormity and complexity of the national factors, only the ones that have the most direct and obvious impacts on EC development are examined in the model. Propositions regarding each factor and its expected impact on EC are also developed to help investigate the influences of these national factors. Figure 2 demonstrates the theoretical model of the national context within the extended TOE model. For simplicity, we name the new model the Culture-State-Infrastructure (CSI) model.
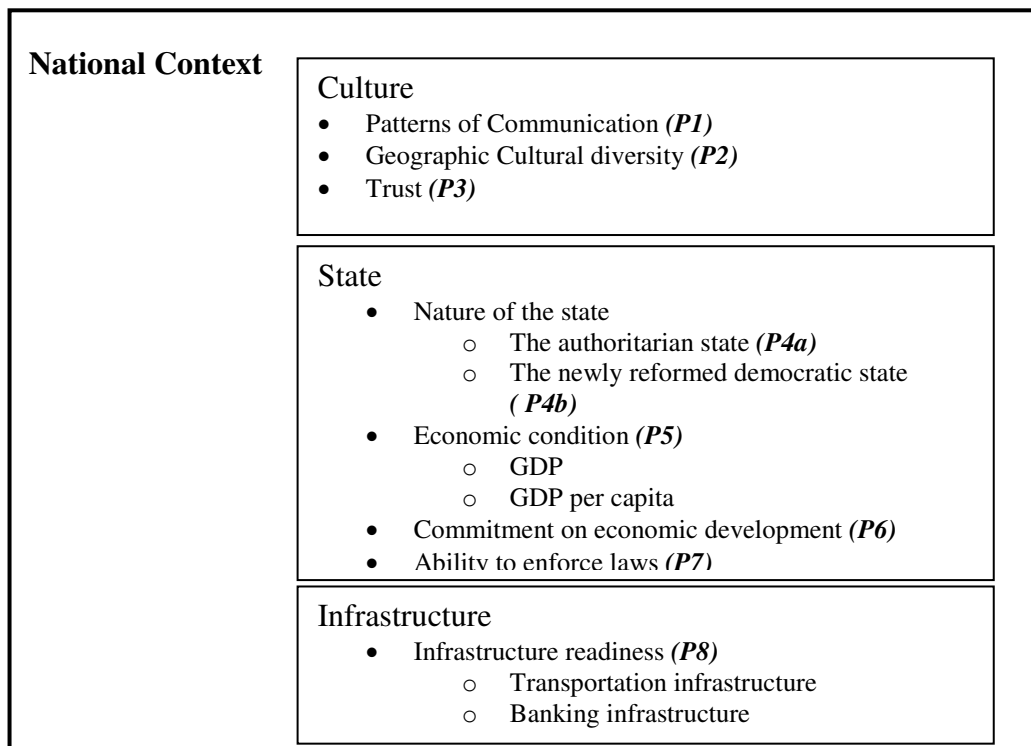
National Context

Culture
- Patterns of Communication *(P1)*
- Geographic Cultural diversity *(P2)*
- Trust *(P3)*

State
- Nature of the state
  - The authoritarian state *(P4a)*
  - The newly reformed democratic state *(P4b)*
- Economic condition *(P5)*
  - GDP
  - GDP per capita
- Commitment on economic development *(P6)*
- Ability to enforce laws *(P7)*

Infrastructure
- Infrastructure readiness *(P8)*
  - Transportation infrastructure
  - Banking infrastructure

Figure 2:   *The National Context Model*

4.2   The theoretical model of the National Context and the propositions

4.2.1   Culture

Culture underlies every aspect of a nation, exerting significant influences on how people act, relate and conduct daily businesses. Although there are a vast number of cultural factors, to keep the scope of the study manageable, the framework only investigates the factors that are most likely to impact the adoption of EC and its development within a country.

The pattern of communication is a cultural factor investigated in the Culture-Policy-Technology framework (Bajaj and Leonard 2004), examining the power distance of the culture and the richness of their communications. EC as a business innovation originated from the western developed countries, was developed upon the foundation of western culture. It promotes simple pattern of communication with low power distance between parties and impersonal, formal messages. Such communication pattern ensures free flows of information between different business parties and allows EC to be fully utilised within the developed countries. Some developing countries, however, exhibit complex pattern of communication which is characterised by a high level of power distance and rich communications. The high level of power distance can make free flows of information between parties of different hierarchical levels difficult, which is detrimental to the development of EC (Kshetri and Dholakia 2002; Tan et al. 2007; Vatanasakdakul et al 2004). The richness of their communication demonstrated through the extensive use of body, facial language and tone dependent interpretation have also given rise to a relationship-based economy. The electronic communication technology offered by the EC cannot address the need for close personal relationships with their business partners and contradicts the traditional "chain of command" established in their organisations (Molla and Licker 2005; Moodley 2003). As a result, the following proposition is made about the impact of pattern of communication on EC adoption:

Proposition 1: The complexity of the pattern of communication in one nation has a negative impact on organisations' ability to adopt EC.

In addition, due to their traditional cultural heritage and geographical disparity, many developing countries developed a distinct multiculturalism which can have major impacts on their business practices. Through the ages, different subcultures developed concurrently in different parts of the country, which gave their regions unique languages, customs and different business practices (Malley 2004). This form of multiculturalism is distinctly different from the migration based multiculturalism the developed countries are experiencing. With no dominating culture and standardised business practices, the deeply rooted subcultures add great complexity to the diffusion of EC, which advocates standardised practices across the board. It is expected that organisations will meet significant difficulties in trying to use EC technologies to meet the needs of each subculture within one single country. This leads to the following proposition:

Proposition 2: The geographical cultural diversity increases the difficulty of EC diffusion.

The final aspect of the culture dimension examined in the CSI model is trust. Trust is a widely studied EC adoption factor as it is instrumental in facilitating online transactions and deal-makings (Araujo 2005; Chae, Yen and Sheu. 2005; Corbitt et al. 2003; Kraemer, Gibbs and Dedrick 2002; Martinsons 2003). As pointed out by Bajaj et al (2004), the notion of trust comprises two dimensions, namely the confidence in the transaction and the confidence in the institutions facilitating the transaction such as banks. .In this model, the trust factor focuses on the users' confidence in the transaction exclusively while the institutional confidence is covered in the State dimension of the national context. Given the

close relationship between trust and online transactions, it is important to note that its effect on EC development may not be shown at the early stage of adoption. As EC development progresses from the routine email communication, product information dissemination to the more advanced inter-organisational cooperation and business transactions, trust plays a gradually larger part in facilitating the effective execution of EC activities. Consequently, in countries with low level of trust, organisations may not experience any trust related impediments to EC development in its early stage of adoption while in countries with high level of trust, EC adopting businesses may not benefit from their country's high level of trust until EC is relatively matured in the organisation. Consequently, the following proposition is formulated:

Proposition 3: The impact of trust on EC adoption grows as EC develops within the organisation.

4.2.2   State

The state dimension of the national context embraces major political, economical and legal factors that have the capacity to influence EC's development within the country. For developing countries with unstable political environment and immature economic system, the state factors can literately make or break the EC initiatives in the country.

The nature of the state is defined in this paper as the form of governance and the political system of a country. Taking the general situation of the developing countries into account, the nature of the state is classified into three categories in the CSI model: authoritarian state, newly reformed democratic state and the democratic state. Given the enormous control a government can have on every aspect of a country, it is surprising to find that the nature of the state is largely ignored in many EC studies. This model focuses only on the first two forms of states: the authoritarian states and the newly reformed democratic states. Purely democratic state is excluded because it represents only a small minority of developing countries and the impacts have been widely studied through earlier research on developed nations(Gibbs et al. 2003; Gibbs et al 2004; Kshetri and Dholakia 2002; Zhu et al. 2002)

An authoritarian state represents any nation that is under the control of a central government without any real forms of political oppositions or being ruled by a dictatorship. This form of state is most powerful in influencing EC adoption. In these nations, laws can be changed easily and political agenda are behind most of the business decisions made, which as a result, produces an inefficient market that is not controlled by the force of supply and demand. They share the common desire for the total control of the media and public information which is detrimental to the development of EC especially in its latter stages (Martinsons 2003; Trappey and Trappey 2001). The authoritarian governments' controlling nature and absolute power within the nation is a significant barrier to EC adoption, but it can also be turned into a major EC driver when the government is convinced that EC development will be beneficial to their political agenda. Once an authoritarian government decides to support EC, it will have the ability to rally the national resources to support EC technologies and wield its political influences to fast-track EC applications' adoption in its businesses.

Proposition 4a: Authoritarian state can be a major driver of EC adoption but its controlling nature will significantly impede its diffusion process as EC develops.

On the other hand, the newly-reformed democratic states are the nations that have recently abolished their authoritarian governments and adopted democracy. Due to the legacy institutional systems and practices left behind by the former regime, these countries normally suffer from wide-spread corruption and political instability (Malley 2004). However, by adopting the democratic constitution, these states are on their way to a more free and effective market economy that will provide suitable environment for EC to thrive. Once the political system stabilises and the market economy starts to mature, organisations will be ready to adopt and use EC as dictated by the market demand.

Proposition 4b: Newly reformed democratic states' unstable nature and immature market impede EC adoption, but as the environment stabilises, its free political and economical environment will propel its development in the future.

Furthermore, the economic condition of a state is a major determinant of its ability to support EC adoption and diffusion in its businesses. For organisations in developing countries, its adoption of EC will need to be supported by significant infrastructure investments on supporting infrastructures such as the national transportation system and telecommunication systems on the national level. Gross Domestic Product (GDP) as a direct indicator of a country's economic condition, is positively related to its ability to commit such investments(Gibbs et al. 2003). The GDP per capita on the other hand signals the wealth of the country's general population. For EC to be widely used, the general population will need to be able to acquire basic EC equipments such as PC and internet access. A high GDP per capita means the general population will have less difficulty in making such investments and consequently forming large potential EC market in the country. The presence of solid market demand will entice the business to make EC investment and push the EC diffusion further across the country. This leads to the following proposition:

Proposition 5: The degree of economic prosperity is positively linked with EC's adoption and diffusion in the organisation.

A country's commitment on economic development is another key factor to be examined under the state dimension of the national context. Due to the fact that most of the developing countries do not have an open, free and market-oriented economy, the governments' commitment on economic development can play instrumental role in deciding the country's economic future and hence the future of any business innovations such as EC. If a country is dominated by isolationist views, it will stop any signs of globalisation by tightening controls over its economy and preventing practices such as EC from taking place. On the other hand, regardless of the nature of the state, if the government is eager to build a prosperous business environment, EC's role as an economic development catalyst can overrule any concerns the government has towards its technology and win the state's support towards EC adoption. For example, the Chinese government has strongly supported the development of EC in an attempt to fast-track its economic development even though the Internet's ability to undermine the government control over public information has long been a concern. (Dedrick et al 2001; Martinsons 2003). Consequently, organisations can expect significant support from the government for their EC adoption effort when a country is committed on economic development.

Proposition 6: Regardless of the nature of the state, a state's commitment on economic development is a positively related to the organisational EC adoption and diffusion within the country.

The final factor of the state dimension is a country's ability to enforce laws, or simply the country's rule of law. The government's ability to enforce laws is a major determinant of users' confidence in the institution and consequently in the EC's system's integrity and reliability (Gibbs et al 2004; Ham et al 2001; Martinsons 2003; Tan et al. 2007). A strict rule of law reflects a sound legal system, stable political environment and an effective institution, which helps to reduce the level of risk perceived by businesses when introducing new practices such as EC to that country.

Proposition 7: A state's ability to enforce laws reassures the potential EC users about the nation's environment and hence encourages the EC development.

4.2.3   Infrastructure

The national infrastructures are the systems that support the development of EC such as transportation infrastructure and banking infrastructure. Their existence, coverage and reliability have been widely

believed to be critical to the development and utilisation of EC (Chvaja, Mokudai and Efendic 2001; Gibbs et al. 2003; Jiang et al 2002). The existence of sound banking and transportation infrastructures are major facilitators of the EC transactions and consequently a major influence in EC technologies' development and EC activities' growth. Only with an EC ready national infrastructure, the organisations are able to adopt and use EC to its full potential.

Proposition 8: Infrastructure readiness is a vital indicator of the successfulness of EC adoption and diffusion.

5   DISCUSSION AND CONCLUSION

Due to the significant differences between the national environments of the developing and developed nations, it is necessary to reconsider the frameworks that are being used to guide studies in the developing nations. Developing countries' complex political systems, inefficient market and immature economy add complexity into EC development. It is therefore important to investigate the national level factors' impact on EC adoption as they can be instrumental in facilitating the development of EC in developing countries. In order to accommodate the differences in developing countries' environment, this paper extends the Technology-Organisation-Environment framework by splitting the environmental context into two separate industrial and national contexts. By focusing on the national context, we then develop a theoretical model which is called the Culture-State-Infrastructure (CSI) model. By examining the national factors in detail through the three dimensions of the national context, the CSI model is able to provide a more complete picture of EC adoption and diffusion in the developing countries. Reflecting the influence of the state, national culture and the infrastructure in EC adoption study enables more practical recommendations to be offered to promote the growth of EC.

The CSI model examines the factors that are usually ignored in EC studies and addresses the importance of investigating national level factors in the developing countries. This model is intended to complement the original TOE framework to better understand how the organisational, technological and the industry contexts affect the EC adoption in developing countries. The incorporation of a nation's culture, state and infrastructure factors into the EC study allows the researchers to predict the EC development drivers and barriers specific to the target country. It can also be beneficial in identifying the best possible ways to promote EC given the target country's general condition. The framework can assist the formulation of strategies for organisational EC development in developing countries from its introduction to the final diffusion stage.

The main limitation of the proposed model is that it does not capture the whole picture of the developing country's complex political, cultural and economical interactions. The unpredictable nature of their economy can pose a significant challenge for the researchers to isolate the affect of each factor on EC. Although the framework have compensated for the complexity by studying a series of factors underlying the state's power and intentions, these factors are far from exhaustive. In addition, the model also lacks the support of empirical data to validate its design and propositions made. The model was designed based on the theoretical understanding of the developing countries' general situations and the results of existing EC studies. The propositions were made on the basis of previous research on the similar factors. Further empirical research on EC's adoption and diffusion in developing countries are needed to support the design of the framework and prove its effectiveness in supporting future studies in this area.

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