

E-COMMERCE PRE-ADOPTION MODEL FOR SMES IN DEVELOPING COUNTRIES

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Abstract - *The adoption of e-commerce is an ongoing issue at a global level, and has become increasingly important because of the current proliferation of the internet. This fact has been further highlighted by the advance of e-commerce, with the emergence of Web 2.0 and social commerce, the new stream of e-commerce. However, the influence of this phenomenon on developing countries has not been given enough attention. As a fundamental part of economies, particularly of developing countries, SMEs need a pre-adoption model in order to apply e-commerce to their businesses. Drawing on the existing constructs of e-commerce adoption, together with interviews with SME managers in Iran, the authors present in this paper a pre-adoption model for e-commerce. This model is tested using data collected in a survey of 59 SMEs in Iran. A pre-adoption model would be a requirement for the use of e-commerce in developing countries as it takes into account current developments in e-commerce, as well as barriers to e-commerce in those countries. It could be a realistic and operational way of applying e-commerce in SMEs within such countries. The findings of this research suggest that organisational readiness and awareness play an important role in the adoption of e-commerce in SMEs within developing countries. This paper analyses these results, and discusses their implications as well as the possible direction of future research, and the limitations of this research.*

Keywords: E-Commerce, E-Commerce Adoption, Developing Countries, SMEs, Social Commerce, Iran.

1 Introduction

The proliferation of the internet influences many technologies, e-commerce technology being one of them. Developments in e-commerce, together with the introduction of Web 2.0 in 2005, have created new business models for the digital economy. These models, based on the capabilities of Web 2.0, have increased the potential for communication among businesses and consumers, using new channels such as blogs, social networking sites, social media and online communities [1]. Many business models such as B2C and C2C have been changed enormously by these developments.

E-commerce has been defined by many authors. However, with the emergence of Web 2.0 applications, this needs to be done in a new way. We can define e-commerce as 'the use of

ICT for buying and selling products and services, as well as information-gathering via the internet, using the new platforms introduced by Web 2.0 applications'.

E-commerce can be an important tool for growth in developing countries, and several authors have highlighted the potential profits of e-commerce for such countries [2-5]. In addition, the popularity of e-commerce is growing at a global level [5]. However, most developing countries are not aware of the benefits of e-commerce [4].

The digital gap between developed and developing countries remains, even though we now live in the 21st century. In this era, many businesses and customers are connected through new platforms or social networks. This development appears to be the result of a new stream in e-commerce called social commerce [6], but it is not taking place in developing countries, as they are still not using the proper system and model for e-commerce [2-5]. Most research is based on the American model, which can be hard to apply to the different conditions of developing countries, which is not analysed in such research [2]. Such research mostly considers the current financial, economic, environmental and technological capacities of developed countries; as such research is generally conducted there. In fact, most research into developing countries is descriptive, and does not have a proper theoretical foundation [4, 5]. Nevertheless, because of the existence of the information society, the digital economy requires global growth and development in e-commerce, especially as a result of advances in e-commerce technologies. E-commerce will be able to open new global markets at low cost and with the minimum capital investment needed to increase profits and compete in the current markets [2], especially with advances in ICT and the emergence of s-commerce.

To fill the current gap in the literature of e-commerce adoption in developing countries, this paper attempts to understand existing barriers to e-commerce adoption in developing countries. It challenges the current barriers, literature and models of e-commerce adoption in SMEs within developing countries. The purpose of the study is to find a realistic framework which can be applied in developing countries. This model needs to be investigated through an

examination into current barriers to e-commerce adoption in those countries.

To develop this model, our research is based on both positivist and interpretivist schools. Positivist schools concentrate more on numbers and on the statistical testing of a model, and following them, we empirically tested our model. In addition, we used interpretivist thought that deals with interpretation of phenomena, using it for interviews and the interpretation of data. Accordingly, it was necessary to substantially investigate the current literature of e-commerce adoption, and specifically the literature concerning developing countries. The next step was to design research which involved a single case study and a multiple data source such as an interview and survey. This method helped us to conduct this research, with the benefit of a few months residence in Iran for research into Iranian SMEs.

2 Literature review

2.1 E-commerce adoption

E-commerce is perhaps the most prevalent way in which economic growth can be subsidised by ICT [5]. In the past, IT adoption has been the subject of two corresponding streams of research. The positivist school has mainly emphasised the alteration models of diffusion and adoption and has treated them statistically and objectively. Meanwhile, the interpretivist school has placed more emphasis on the comprehension and construction of reality [5].

E-commerce adoption is influenced by a variety of factors, notably perceived usefulness, perceived ease of use, organisational readiness, and external pressure [7, 8]. However, different factors are found in developing countries [2-5]. Although, in earlier research, compatibility was perceived to be an important factor influencing IT adoption, [8] categorised compatibility as a significant aspect that was found independently of other factors.

According to [9], large companies are leaders in e-commerce adoption because of their IT resources [9]. In fact, e-commerce adoption by SMEs is limited, regardless of the many prospective benefits that e-commerce can bring [2, 8]. One of the possible reasons for this is that SMEs do not possess the required level of resources to invest in sophisticated technologies [2-5]. According to [3], there is insufficient research into the reasons why some companies in developing countries adopt e-commerce while others do not. In addition, little attention has been paid to the factors that contribute to this.

In order to explain the factors influencing e-commerce adoption in developing countries, a perceived e-readiness model has been developed, based on managerial perceptions [3]. They determined that organisational factors, including awareness, human resources and business resources, influence initial e-commerce adoption to a greater extent than

environmental factors. In recent years, scholars and policy makers have agreed that e-commerce is a crucial tool for socio-economic progress in developing countries [10]. Nevertheless, many benefits and conditions exist for adopting e-commerce in developing countries, at a time when the benefits of ICT are unavailable to many [5]. Datta's study proposed a global information technology adoption model that was initially validated by the collection of data in developing countries.

SMEs in Iran are categorised as companies with between five and 49 employees. The population of the research in this paper consists of those SMEs in the IT sector which we were able to investigate. According to the literature and document review which we carried out in Iran, Iranian SMEs lack awareness of e-commerce, and are also challenged by problems of infrastructure. Although previous governments have had specific plans to develop ICT throughout Iran, and among SMEs in particular, the trend of e-commerce adoption is not positive in this country. However, they have recently reconsidered their need for a digital economy and have attempted to join the online marketplace. This study will investigate the barriers to the use of e-commerce in Iran.

2.2 Social commerce and e-commerce

Social commerce is the future of e-commerce [11]. Advances in e-commerce are turning e-commerce into s-commerce, an important factor which should be considered by SMEs in their business plans. Social networks have had a considerable impact among internet users, in particular on the way they communicate and share data – in particular on Facebook, MySpace and YouTube [12].

Some authors believe that if social networks are helping to improve the problem of trust in e-commerce, then adoption of this new concept would have a positive impact on the online marketplace, where SMEs need to be located in order to sell their products. This development in e-commerce requires more attention from researchers and academics attempting to understand e-commerce adoption. It should be an agenda for SMEs to work on, and they should restructure their business because of this dynamic environment [6].

2.3 Study 1

In the first study we reviewed the relevant literature, although there is not enough written on e-commerce adoption to fully develop this area. The aim of this phase of the research was to determine whether any patterns could be discerned in e-commerce adoption within a developing country. Interviews were the other source of data collection in this phase: we interviewed a number of SME managers in order to research barriers to the use of e-commerce in Iranian SMEs.

In the current literature of e-commerce adoption, many conceptual frameworks exist which are mostly influenced by

two main theories – the Technology Acceptance Model (TAM) [13], and the Theory of Planned Behaviour (TPB) , [14, 15]. Other research into e-commerce adoption is influenced by TEO and other theories [16, 17]. However, other research has followed the main theories concerning e-commerce adoption, and the authors have proposed their own research frameworks. We would categorise them in two main areas to design our model.

Researchers in the first category, refer mainly to organisational readiness, but use different variables in their models. Authors such as [5] highlight the importance of favourable conditions and technological opportunism for e-commerce adoption in developing countries. [16] researched into e-commerce adoption in Spain, and concluded that it is essential to monitor organisational, environmental and technological factors during the adoption process. [17] conducted research into the same factors in Jordan. [4] conducted research in Nepal, showing that cognitive, economic and socio-political variables affected e-commerce adoption in that country. [8] proposed a model which emphasised organisational readiness, external pressure, perceived ease of use and perceived usefulness. Wong [18] researched into Singapore, investigating the structure of its economy, the demographic structure, the infrastructure for physical distribution, the developed ICT workforce, and the transparent and trusted financial and legal system, in order to examine e-commerce adoption in Asia. These studies indicated that many factors influence e-commerce adoption, and facilitate organisational readiness to address e-commerce in SMEs. Other research exists into this topic which we were not able to cover. Together with the data we gathered in our interview, the literature review of this topic mostly demonstrated the impact of organisational readiness on e-commerce adoption.

The literature review also showed that awareness of the benefits of e-commerce was important to SMEs in developing countries. This was also supported by our interviews. [19], in a study of e-commerce adoption, emphasise understanding by management of the business benefits of e-commerce as well as the support of senior management [19]. [20], in their research into website adoption, demonstrated the role of perceived usefulness for companies in the e-commerce adoption process [20]. In a study of internet adoption, [21] showed that perceived benefits and awareness of the benefits of e-commerce can increase the level of e-commerce adoption [21]. This literature, together with our interviews with managers of SMEs, produced our second variable, which is lack of awareness.

2.4 Study 2

In the second study, we applied the patterns shown in our interviews together with the literature review, and proposed a model (Fig 1.0). This model was subsequently tested by an empirical study in Iran.

3 Theoretical foundations and the model of research

To propose the model, we undertook a substantial literature review, together with a number of telephone interviews with managers of SMEs in Iran, in order to produce a multiple data source of the data. The purpose of using both qualitative and quantitative methods was to increase the validity of our research.

Initially, in the qualitative phase of this research, the data collected from interviews showed a number of patterns which we used, together with the key issues evident in the literature review, to produce a hypothesis. The themes shown in these patterns are organisational readiness and the lack of awareness among SMEs. This phase of the research drew on interview patterns and previous work on e-commerce adoptions, to determine that certain variables needed to be discussed and hypothesised. These variables shaped both the theoretical foundation of our work and the research model, which deal with the pre-adoption process used when applying e-commerce to SMEs in developing countries.

3.1 Organisational readiness

The term ‘organisational readiness’ encompasses issues such as the quantity of IT employees and ICT infrastructures in a company, as well as on a national level, internet penetration in society, technological readiness and e-banking infrastructure among others. According to [9], the success of IT adoption has often been predicted by the level of sophistication of both IT infrastructure and organisational readiness. However, business cultures in many countries do not support innovation, and so organisational readiness is not high, something which is true of Iranian SMEs.

According to [3], organisational readiness for e-commerce comprises four elements: awareness, governance, commitment and resources. Awareness denotes the organisation’s understanding of the advantages and risks of e-commerce

One of the more challenging issues related to e-commerce adoption is the lack of infrastructure in the ICT and financial sectors, which includes a lack of e-banking in developing countries [3, 4]. This was also a pattern we found in our interviews. Indeed, the adoption of e-commerce requires SMEs to have easy access to the internet, as well as a strongly supportive industry. The absence of these factors can form a barrier affecting organisational readiness in SMEs. As a result, technological and environmental issues, as shown in previous research [4, 5, 8, 16, 17], have a fundamental effect on the adoption of e-commerce throughout the world, and particularly in developing countries. Accordingly, our first hypothesis is that:

H1: organisational readiness is positively related to e-commerce adoption in developing countries.

3.2 Lack of awareness

The term ‘lack of awareness’ refers to cognitive issues in SMEs, as well as factors including lack of awareness, lack of ICT literacy, lack of English language skills, lack of local language availability, and poor managerial perceptions. Issues such as cognitive components play a major role in the initial adoption of e-commerce in developing countries [4]. Lack of awareness is one of the important factors which produce cognitive barriers [3]. According to [4], cognitive barriers include lack of awareness, lack of local language availability, lack of ICT literacy, and lack of English language skills.

In the case of Iranian SMEs, the lack of English language skills and of ICT literacy are key determinants of the use of e-commerce, as is the case in other developing countries [4]. Senior managers also play an important role when they have positive perceptions of e-commerce adoption and determine that it can bring strategic value to their companies. This is true in developed countries, as well as in developing countries [8]. This perception requires awareness of the business benefits of e-commerce in developing countries [3]. Such barriers were also apparent in our first study. Our second hypothesis is therefore that:

H2: awareness is positively related to e-commerce adoption in developing countries.

3.3 Research model

A model can be defined as an approximation to, and simplification of, some feature of real life [22]. In this research, we developed a primary model for pre-adoption of e-commerce in developing countries, in order to gain a better understanding of e-commerce. This model is an elemental framework for adoption, as SMEs in developing countries need initially to work on these variables, if they are to adopt e-commerce in their businesses.

As shown in Figure 1, there are three variables in this model – organisational readiness, awareness and e-commerce adoption. It is recommended that SMEs in developing countries use a more simple operational model, to help them to apply e-commerce in their businesses, rather than more complex models based on American conditions. The reason we selected these constructs is because they are believed, according to the literature review, to be significant when understanding and explaining the decision of SMEs in developing countries to adopt e-commerce.

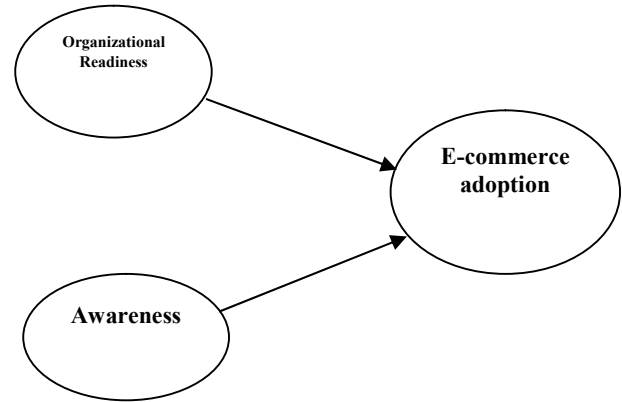


Figure 1. E-commerce pre-adoption model

4 Research methodology

4.1 Research design

[22] divide research design into four different elements: the research questions, the theory which shapes the research framework, the data, and the use of that data, once it has been collected. Usually these do not develop separately, or in a preordained order [22]. The primary objective of this research is to develop a pre-adoption model for e-commerce, and to test the model using its constructs. In order to achieve this objective, we pose some research questions, which are shown in Table 1.0.

Table 1.0 Research Questions

RQ1	What are the barriers to e-commerce adoption for SMEs in developing countries?
RQ2	Could cognitive issues for SMEs, such as lack of awareness and knowledge of the benefits of e-commerce, or lack of computer literacy, influence their level of e-commerce adoption?
RQ3	Could organisational readiness influence adoption of e-commerce by SEMs?

We selected qualitative strategies of inquiry for the first study, and quantitative strategies in the second study, in order to test the model empirically. In the first study, our preference was for a case study. The data for the first study was collected through unstructured interviews with SME managers in Iran, whereas in the second study, which had a non-experimental design, data was collected using a paper survey.

4.2 Participants

When we conducted our research in Iran, we chose to target SMEs, because, in general, they have a crucial impact on the economies of developing countries, and they form a large part of these economies. To focus our research, we selected SMEs in the Iranian IT sector.

4.3 Data collection

When sampling the research, we made use of purposeful sampling. To make sure that the research population was sufficiently representative, we used random quota sampling based on different issues, such as age and geographical factors. In the second study, we collected data using a paper questionnaire in Tehran. Before the main survey, a pilot survey involving a small number of businesses was undertaken in order to ‘debug the instrument’ – ensuring that the wording of the questions was clearly understood by the respondents. Our sample consisted of 59 SMEs in Iran. The questionnaire items in this survey used a Likert scale to measure the data. The scale ranged from 1 = strongly disagree to 5 = strongly agree.

We also reviewed the literature related to e-commerce in Iran to research barriers to the use of e-commerce in Iranian SMEs, as well as conducting a number of unstructured interviews with SME managers in Tehran, in order to determine the barriers facing them.

4.4 Data Analysis

4.5 Findings

In data analysis phase, we initially performed tests of reliability and validity.

4.6 Reliability

The reliability of a survey is the stability of the measures it uses. The aim of this stability is the production of consistent results from repetitive measurements. To measure the reliability of this research, we tested its internal consistency, which was calculated using the method known as Cronbach’s Alpha. Since Cronbach reliability coefficients need to be 0.70 or higher, this research has the value of Cronbach’s alpha greater than 0.70 as shown in Table 2.0, indicating adequate internal consistency.

Table 2.0 Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha, Based on Standardized Items	N of Items
0.850	0.851	44

To improve the reliability of the test, we also amended the questionnaire after the pilot test, as the reliability of the research depends on the ‘piloting of the instrument’ and the wording of the questions. These two types of reliability tests ensured that we could analyse the data from the survey.

4.7 Validity

In seeking content validity, we are attempting to ensure that the measures of the questionnaire are drawn from all the potential measures of the material under investigation [23]. To obtain a high content validity, we undertook a substantial literature review in the area of e-commerce and piloted it using a small number of SMEs. Moreover, some of the constructs – for cognitive and organisational readiness – are taken from the existing literature, and have frequently been shown to demonstrate evidence of strong content validity. It is evident that such constructs drew their items from different validated sources, something which improved the validity of this research with regard to the measurement of the constructs. However, we also considered the face validity of the research by simply showing the survey to lay people, in order to ensure that the questions were fully comprehensible. We conducted the main survey after taking these steps.

4.8 Demographic characteristics

The proportion of participants in this research was 82% male and 18% female. 58% of the participants had a first degree, and 32% a postgraduate degree. 55% had a degree in a subject related to ICT. The average age of the participants was 35.

4.9 Testing of hypothesis

To test the relationship between e-commerce adoption, organisational readiness and awareness, we used Pearson’s correlation. This method takes two random research variables, and measures their linear dependency. It is one of the most important forms of correlation measurement, and has had a major influence on research methods [24]. The range of the coefficient is from -1 to 1. When a correlation is close to -1, a negative relationship between variables is indicated, while a correlation closer to 0 denotes a non-existence relationship between the two variables [24]. Therefore, a correlation close to 1 means that Y increases when X does.

We computed the correlation between our variables using SPSS software. The results of the hypothesis testing are shown in Table 3.0.

Table 3.0 Results of Hypothesis Testing

variables	Hypothesis	r- value	p- value	Results at 99% confidence level
awareness	H 1	.368(**)	.002	Supported
Organizational readiness	H 2	.557(**)	.000	Supported

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

According to these results, there is a positive relationship between awareness and adoption of e-commerce among SMEs. The result of this hypothesis is supported at a level of 99% confidence. Accordingly, greater awareness of the benefits of e-commerce adoption can make it more likely among SMEs in developing countries. This highlights the roles played by awareness, local language availability, lack of ICT literacy, perceptions of managers and English language skills in SMEs.

The results of testing the second hypothesis are also supported at a 99% confidence level. The relationship between e-commerce adoption and organisational readiness is both strong and positive. This relationship demonstrates the importance of the role played by organisational readiness in e-commerce adoption. Relevant issues include the number of IT employees and ICT infrastructures, both within a company and at the national level, internet penetration within society, technological readiness, and the e-banking infrastructure, among others.

These results therefore show a positive correlation between our hypotheses and e-commerce adoption. The results are consistent with those produced by the qualitative phase of our research, which indicates that adoption of e-commerce is positively related to both organisational readiness and lack of awareness among SMEs in developing countries.

The strong correlation and good r-square, together with a replication of the pattern we found in our interviews with managers of SMEs, were positive enough outcomes for us to decide against testing the model using other methods, such as regression.

5 Discussion, implications, limitations, and future research

5.1 Discussion

Two different studies based on a single case study in Iran were conducted in order to produce the model (Fig 1.0). These two studies demonstrate the important role played by organisational readiness and awareness in the adoption of e-commerce in SMEs in developing countries.

E-commerce adoption is an ongoing issue, due to the proliferation of the internet and advances in e-commerce technologies. This provides an opportunity for SMEs in developing countries to expand their presence in domestic markets. E-commerce is also beneficial, as it gives access to regional and global markets. However, SMEs in Iran and other developing countries suffer from a range of problems [2-5]. Important among these problems are organisational readiness and lack of awareness of the benefits of e-commerce

As mentioned elsewhere in this paper, organisational factors play an important role in the adoption process within

developing countries. Barriers to adoption include the low number of IT employees and ICT infrastructures in SMEs, low internet penetration within Iran, environmental law and technological readiness in the country, and the e-banking infrastructure. These factors are mostly controlled by the state with the central government playing an important role in creating a better environment for development.

The other factors – lack of awareness, including lower levels of knowledge about the advantages of e-commerce, lack of local language availability, lack of ICT literacy and lack of English language skills in SMEs – have their own impact on e-commerce adoption. Other research in developing countries has highlighted such factors affecting adoption [3]. Having established these two key factors through our research, we developed and tested our model. We would like to propose it as an action plan for developing countries, when they take pre-adoption steps as part of the e-commerce process. These variables should be carefully considered, so that developing countries are ready to adopt e-commerce.

5.2 Implications

Previous studies showed different findings concerning e-commerce in developed and developing countries, so that developing countries require specific steps to be taken if they are to adopt e-commerce [2-5]. This could be a basis for further rigorous research into e-commerce in developing countries such as Iran. Using a proper methodology, this research introduced the pre-adoption model for e-commerce, and contributed to the theory of this topic by investigating pre-adoption models in developing countries using multisource data. The research shows that the development of e-commerce is continuing, and that the adoption of e-commerce is an ongoing issue in IS research. As we mentioned in a previous study [25], work on e-commerce adoption should change to include the adoption of social commerce. It is also important to consider the use of new platforms in e-commerce, following the introduction of Web 2.0. However, it is essential for SMEs involved in e-commerce to ensure that they know about s-commerce, while they are in the adoption phase.

5.3 Limitation and future research

In our initial literature review, we only examined a certain number of studies in order to find patterns within the literature. We were not able to look at all the research in this area because of the limited time and resources at our disposal.

The other main problem in conducting research within businesses is that it is difficult to persuade managers to participate. This is especially the case in developing countries. In the case of Iranian SMEs, more research needs to be undertaken, as we were only able to investigate 59 SMEs in that country. Moreover, the model has only been tested in Iranian SMEs in the ICT sector, and so should be

expanded to encompass more SMEs, in order to further investigate e-commerce adoption in SMEs within developing countries.

We concentrated our investigation on Iranian SMEs. The results were not sufficient to generalise the outcomes, and so more research in other developing countries is required. Recent sanctions have made development difficult in Iran, and SMEs in that country face many problems when attempting to globalise. Additionally, some key infrastructures, such as e-banking, have an influence on e-commerce adoption in that country.

6 Conclusion

This study contributes to the theoretical basis of IS and e-commerce adoption studies by proposing and testing a pre-adoption model for e-commerce. The adoption of e-commerce in SMEs has not been substantially investigated, and this is especially true of SMEs in developing countries [2-5]. This is despite the fact that SMEs play an important role in all economies.

The results demonstrate a significant relationship between organisational readiness and the adoption of e-commerce. It also shows that there is a positive relationship between awareness of e-commerce and its adoption. The discussion presented above shows the importance of organisational readiness and lack of awareness in the pre-adoption process for e-commerce in SMEs within developing countries. The model has been tested in a single case study in developing countries, using multiple data sources, collected through interviews, secondary data and surveys of Iranian SMEs.

The results indicate that opportunities exist for the discussion of e-commerce adoption in developing countries. One future direction for this research would be to continue investigating this model in other developing countries, and to test the model in SMEs in industries other than ICT. This could improve the validity of the model, and produce a better method of generalising the results. It is also important to locate any other existing barriers to the adoption of e-commerce.

The majority of Iranian SMEs do not use e-commerce properly. The reason for this, as indicated in this paper, is that they are not aware of the benefits of e-commerce, and, as a result, are not ready to adopt it. It is important, therefore, to increase both knowledge and understanding of e-commerce within SMEs in developing countries, so that they are aware of its benefits and can prepare their organisations to participate in the contemporary digital economy.

The factors influencing adoption which have been demonstrated by this research – organisational readiness and lack of awareness – can be improved through support from government, as has been demonstrated by other research which shows the importance of the governmental role (eg.

[4]). Governments of developing countries can improve awareness of e-commerce within their borders, and can also play a key role in the development of their countries' infrastructure. This is clearly demonstrated in Iran, as the telecommunications, IT and banking systems in that country are all controlled by central government.

7 References

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