Abstract

The growth of eMarketplaces has attracted interest from researchers in recent years and their low survival rates have also been reported in the literature. The success of some eMarketplaces and the failure of others raised the question as to what factors lead to eMarketplace sustainability. Much of the existing research has focused on transactional cost, supply chain management and hierarchical structure. Applying the theory of service science and value co-creation (both of which have been applied and tested in other business fields) to the study of eMarketplaces, this paper proposes a framework for eMarketplace sustainability. The framework is tested on a dataset of 85 eMarketplaces in Saudi Arabia, which plays a leadership role in information and communication (ICT) development in the Middle East region. Saudi Arabia’s experience with eMarketplaces is expected to influence other countries in the region and beyond. Eight factors were tested and only five were found to be statistically significant in influencing eMarketplace sustainability. The results suggest that service science factors are the major factors influencing eMarketplace sustainability. This paper makes two significant contributions: (1) it provides an initial framework for eMarketplace sustainability; and (2) it enhances the understanding of eMarketplaces in Saudi Arabia, particularly in terms of factors that ensure their sustainability.

Keywords: eMarketplace, Sustainability, Service Science, Value co-creation, Service system
1 INTRODUCTION

Electronic marketplaces (eMarketplaces) have been providing value to both buyers and sellers, in addition to simply serving as a trading system (Matook & Vessey 2008; Petersen et al. 2006; Reilly 2000). Buyers are able to determine the lowest market prices simply by comparing the wide range of products offered on eMarketplaces (Eng 2004). Likewise, sellers can easily and cost effectively reach new customers; hence, they find eMarketplaces appealing (Barratt & Rosdahl 2002). The application of Internet technologies has led to the development of business-to-business (B2B) eMarketplaces such as Alibaba.com, which connect multiple enterprises to enable better international exchange (Wang et al.2008). Many have argued that the success of B2B eMarketplaces will have a significant impact on the economy (Malone et al.1989). B2B eMarketplaces enable companies to save on overheads incurred by transactions, simply by using electronic procurement methods over the Internet. Therefore, it was predicted that the majority of B2B transactions would be done via eMarketplaces by 2003 (Nairn 2000). However, despite business enthusiasm about B2B eMarketplaces, the growth of B2B eMarketplace transactions has not met previous expectations (Zhao et al. 2009). In particular, the eMarketplace shakeout in the late 1990s and early 2000s (Daniel et al. 2004; Zhao et al. 2009) spread uncertainty about their future role (Pflügler & Turowski 2010), raising questions as to whether B2B eMarketplaces will remain as a viable business option. Nevertheless, many B2B eMarketplaces survived and thrived (Zhao et al. 2009). Therefore, it is interesting to investigate why some B2B eMarketplaces survive while others have not, and to determine the key factors that contribute to eMarketplace sustainability.

The concept of value and co-creating value is well-known in business research (Haas et al. 2012). In B2B markets, the main concern is to capture, create, and deliver value (Anderson & Narus 1998). EMarketplaces use the idea of value to attract participants to join the market, so it becomes more attractive for others to participate (Daniel et al. 2004). To be sustainable, eMarketplaces should deliver value to both buyers and sellers. Developing services by involving the participants in the development process is beneficial to both the eMarketplaces and its participants. Involving participants in the co-creation or co-production of a service as part of the eMarketplace, may be essential to increase eMarketplace’s utility and attractiveness, leading to its sustainability. Thus, by involving the customer in the eMarketplace delivery of the service, the role of the customer changes from passive to active and must be integrated with the activities of the eMarketplace.

Consequently, the new discipline of service science, which has been defined as the integrating of management, engineering, finance and operations for the purpose of value co-creation with customers (Maglio & Spohrer 2008), is applicable to eMarketplace sustainability. There is a lack of empirical evidence to gauge the sustainability of eMarketplaces and its impact on performance, partly because of the difficulty in developing measures and collecting data (Laseter & Bodily 2004). A related issue is the lack of theory to guide empirical research in this field (Benbasat & Weber 1996). eMarketplace research is a multi-disciplinary research area and the need to learn from related disciplines is crucial. Theories from disciplines other than information systems (IS), such as strategy, management and organisational behaviour, must be considered. A new model should be considered by adopting key learnings from these studies. There is a need for a paradigm shift from eMarketplace theory which currently concentrates on the environmental and organisational aspects of these systems.

The objective of this paper is to identify the factors contributing to eMarketplace sustainability. This paper proposes a framework for eMarketplace sustainability that links organizational, environmental, services and operational factors to eMarketplace sustainability. This paper is organised as follows: section 2 synthesizes and discusses the literature on B2B eMarketplaces from the perspective of various disciplines. The proposed framework is presented and the hypotheses are discussed; section 3 describes the research method used in this study and the findings from the data analysis, and the results are presented in section 4. Finally, the paper concludes with discussions on the study’s contributions, the limitations of the study, and future research directions.
2 LITERATURE REVIEW

As is the case with the study of any new and rapidly growing phenomenon, the terms used to address it are usually both evolving and confusing; thus, a clear definition of each term provides a rigorous foundation for the area of study, for both practice and research. For almost a decade, there has been no widely accepted definition of an eMarketplace. In a broad sense, eMarketplaces are places where buyers and sellers conduct transactions by electronic means. Other terms used include e-hubs (Kaplan & Sawhney 2000), exchanges (Pavlou & El Sawy 2002), inter-organisational systems (Standing et al. 2006) and communities (Büyüközkan 2004).

The eMarketplace domain has played a significant role in businesses from a research and practical perspective. Thus, the sustainability of eMarketplaces is an important area of research and has gained a lot of attention lately in information systems (IS) research (Standing et al. 2010). From a theoretical point of view, there seems to be a lack of application of value proposition and value co-creation concept (both of which have been applied and tested in other business fields) to the study of eMarketplaces. From a practical perspective, eMarketplaces affected business owners and consumers with the rise of the dot.com bubble. After the crash and the subsequent decline in eMarketplaces figures, eMarketplace survivors provided a business model to be considered (Glassberg 2007). Furthermore, the need to indicate a successful incorporation of experience gathered by the analysis of past failures and successes is fundamental to the study of eMarketplaces.

Daniel et al. (2004) studied the environmental and organizational factors of eMarketplaces sustainability. According to their study, eMarketplace sustainability can be influenced by the following factors: political and economic regulations in which the marketplace operates; the industry influence, and the ability of individual firms to participate in eMarketplaces. However, their framework was based on the automotive industry only, and therefore needs validation in other fields. Standing et al. (2006) examined the participants’ impact on eMarketplace sustainability. They found that to achieve high levels of participation, community-based eMarketplaces may require low-end technology features. In contrast, to ensure the global reach of an eMarketplace, streamlined processes and back-end integration are needed to handle the high volume of purchases from overseas. In another study, Zhao et al. (2009) examined ownership structure, market competition and prior network connections, all of which affect eMarketplace sustainability. This study also evaluated the degree of influence of neutral (created and operated by an independent third party) and biased (operated by a group of major players in an industry) eMarketplaces in terms of the extent of eMarketplace sustainability. They found that biased eMarketplaces are less likely to sustain than neutral ones, since the biased eMarketplaces significantly reduce the bargaining power. Another finding of their study is that, if an eMarketplace is launched by a neutral intermediary, sufficient numbers of participants are needed on both sides, that is, buyers and sellers.

More recently, Saprikis and Vlachopoulou (2012) examined the characteristics of eMarketplaces that affect eMarketplace sustainability. Furthermore, they investigated factors that influence suppliers' level of use of B2B eMarketplaces. Nevertheless, they did not examine the influences of added-value services, which are also an important aspect. The prospect of value conservation or sustainability is a fundamental motivation for value creation (Amit & Zott 2001). However, a review of past eMarketplace sustainability studies indicates that they focused mainly on organizational, environmental factors. Approaches that consider environmental and organisational factors only, where users are passive, are highly ineffective in B2B eMarketplace sustainability (Matook & Vessey 2008; Molla & Deng 2008). Therefore, eMarketplaces should be viewed using different theories such as service science by co-creating value with participants and considering the eMarketplace as a service system. This paper also suggests that the underlying theory of service science can form a solid foundation for eMarketplace sustainability. In order to fill this gap, concepts from the study of service science, particularly service systems and value co-creation factors (adapted from established service science theory) are included in the proposed framework for eMarketplace sustainability.
The framework will be tested on data collected from Saudi Arabia, which falls within the developing countries in the Middle East, a region often considered moderately prepared for the eMarketplace (Alrawi & Sabry, 2009). The key factors that have been identified as influencing eMarketplaces in Saudi Arabia are: user interface quality, service information quality, security risk awareness, and privacy perception (Eid, 2011). A report by The Economist ranked the “e-readiness” of the world's largest economies to find the most suitable countries for online business (2009) and Saudi Arabia’s ranking was 52 out of 70 countries. A further report in 2012, by the U.N. e-readiness survey, ranked Saudi Arabia at 41 out of 70 countries, which indicates that several steps have been taken and special attention has been devoted to improve and expand the online business in Saudi Arabia in the last few years.

2.1 Service Science

Due to the evolving nature of eMarketplaces, no single theory can capture the complexity of the phenomena of eMarketplace sustainability and comprehensively explain it. Scholars have explored this issue from diverse theoretical perspectives, each of which has enhanced knowledge about eMarketplaces. For instance, some researchers applied theories of supply chain management when analysing eMarketplaces, and suggested that eMarketplaces could support supply chain relationships (Grieger, 2003). Christiaanse (2005) argued that eMarketplaces could provide benefits beyond supply chain activities by increasing network optimization.

However, these theories are ineffectual, as argued by Wang and Archer (2007) and Wang et al. (2008). We further argue that eMarketplace is a service system that enables its participants to co-create value. Service science integrates various disciplines such as management, engineering, finance and operations, with the aim of developing a general “theory of services” that contributes to the service economy. The development of this theory has rekindled interest in the study of service systems. In order to better understand service systems, there is a need to move from product logic towards service logic as proposed by Vargo and Akaka (2009) and Ng et al. (2009). They explained the need for a new approach based on the economic exchange fundamental to service provision and argued that everything should be addressed from the service perspective. Within such a domain, eMarketplaces do not provide value, but value propositions and the customers create the value with the eMarketplace. Thus, according to service logic, a foundation of service science can be used to explain value creation in eMarketplaces (Vargo & Akaka, 2009). Similarly, scholars have highlighted the need for eMarketplaces to offer value-added services beyond the traditional functions so as to remain sustainable (Balocco et al. 2010; Daniel et al 2004; White et al. 2007).

Kleinaltenkamp (2007) suggests a close fit between service science and B2B markets and he concludes that the characters of service markets are dominating B2B markets. Moreover, Jacob and Ulaga (2008) identify some synergies between the two and calls for more scholarly research in this area. For example, service science promotes the shift of exchange from products to the underlying process of value co-creation within the exchange. Clearly, there is an increasing body of literature in B2B markets examining the customer centric approach (Heinonen et al. 2010; Lindgreen & Wynstra 2005), as in service science research. Furthermore, service science focuses on the cooperation process of value co-creation between parties. Indeed, tight collaboration between buyers/sellers is crucial to the understanding B2B exchanges, and the underlying concept of customer integration (Jacob, 2006). Lastly, Vargo and Lusch (2008) propose value in the context of operant resources that creates value for all stakeholders. At the same time, B2B markets research has been exploring the value embedded in products to recognise value creation in B2B relationships (Jacob & Ulaga 2008). Therefore, understanding B2B marketplaces in the context of service science seems appealing.
2.2 EMarketplace Sustainability

The Concise Oxford English dictionary highlights the complexity of the adjective sustainable, defining it as “able to keep going over time or continuously” (2012, p. 1452). Unfortunately, a review of IS literature shows that the term sustainability has been inconsistently defined. Carter and Rogers (2008) defined the concept of sustainability as the integration of environmental, social and economic criteria that enables an organisation to achieve long-term economic viability. Pade et al. (2009) defined sustainability as the ability to meet the needs of the present project without compromising the ability of future needs, and it is closely related to the economic aspect. Other factors such as the cultural and political approval and value to participants need to be considered as well (Keniston 2005). It is important that all of these factors be integrated in order to achieve overall sustainability (Hietanen 2002). Sustainability in the eMarketplace context is considered an important prerequisite of business success (Daniel et al. 2004). Therefore, sustainability requires consideration of the business environment as well as the business itself (Porter 1985), both of which have to be viable. Sustainability also requires the willingness and ability of the business to respond to change in a timely way that does not hinder the success of the business (Stafford et al. 1999). Sustainability does not imply ‘lasting forever’; it only suggests improving the long-term economic performance, especially after unanticipated changes in the economic structure have occurred.

2.3 Proposed framework and Hypotheses

This paper suggests that the underlying theory of service science can serve as a solid foundation for eMarketplace sustainability. Starting with the models proposed by Daniel et al. (2004), which provide a general overview of sustainability models for eMarketplaces, and others (Saprikis & Vlachopoulou 2012) which include the environmental and organisational aspects of eMarketplace sustainability, a proposed framework that integrates and applies the two main variables of B2B eMarketplaces sustainability (i.e. organisational and services aspects) is presented in this section together with the research hypotheses of this paper.

![Proposed framework for eMarketplace sustainability](image)
As shown in Figure 1, the upper left-hand side shows the environmental and organisational aspects of eMarketplaces: namely, regulation, economic growth, participants bargaining power, individual firm strategy, and industry IT readiness which have been identified in related studies on eMarketplaces (some of them have not been validated previously) are linked to the sustainability of eMarketplaces. The lower left-hand side represents the services and operational aspects, related to the efficiency and effectiveness of eMarketplaces from previous related studies (i.e. from service science domain). The combination of these two aspects should lead to the sustainability of eMarketplaces.

2.3.1 Regulations

Government bodies usually have an interest in structuring eMarketplaces in a way that does not distort the operation of a competitive market. For instance, the Federal Trade Commission in the USA and the European Union has taken action to allow the distribution of bargaining power (Daniel et al. 2004). According to Stockdale and Standing (2002), it is necessary for companies to have knowledge of the legislation that controls their specific industry or any eMarketplace they may be considering. This awareness allows the participants to build their decisions about which and when to join an eMarketplace. Thus, the first hypothesis is formulated:

Hypothesis 1 (H1): Awareness of eMarketplace regulations positively influences eMarketplace sustainability.

2.3.2 Economic growth

The economic conditions will also have an effect on an organisation’s use of eMarketplaces, and thus its sustainability. In a period of recession, buyers will use eMarketplaces to make sure they receive the best available price. Sellers too, are willing to use such services to ensure they sell all of their stock. On the other hand, during periods of expansion, demand will exceed supply and one of the ways to continue receiving the desired supplies is through the long-term relationships developed by eMarketplaces (Daniel et al. 2004). Thus, this leads to Hypothesis 2 as follows:

Hypothesis 2 (H2): Economic growth positively influences eMarketplace sustainability.

2.3.3 Participants’ bargaining power

eMarketplaces may help participants reduce the risk of being locked out by dominant business partners. In this situation, an eMarketplace may actually switch power from its suppliers to the buyers so that the eMarketplaces allow buyers to assess suppliers who may ultimately offer better purchasing decisions (Rask & Kragh 2004). Big players in an industry can influence their suppliers to join a particular eMarketplace if they wish to continue trading with them. For instance, Walmart (the retail giant in the USA) developed a private eMarketplace and forced its suppliers to use it (Daniel et al. 2004). This leads to Hypothesis 3 as follows:

Hypothesis 3 (H3): Participants’ bargaining power positively influences eMarketplace sustainability.

2.3.4 IT readiness

The nature of eMarketplaces is accelerated by technologies moving towards convergence, resulting in the involvement of multiple stakeholders and deriving different benefits. As Miller (2001) points out, integrating a firm’s information system with the eMarketplace is crucial to its participation. In fact, the fewer firms in a given industry that integrate their systems to benefit from the eMarketplace, the less willing they will be to participate at the industry level (Daniel et al. 2004). This effect may be notable in certain industries where the use of IT is limited. For example, if most of the automotive industry participants did not have a compatible information system with the eMarketplace, they would be less likely to participate (Christiaanse & Markus 2003). Furthermore, technological compatibility is also
crucial to ensure operational effectiveness for the eMarketplace by interacting with a large number of suppliers (Balocco et al. 2010). This leads to hypothesis 4 given below:

**Hypothesis 4 (H4):** Industry IT readiness positively influences eMarketplace sustainability.

### 2.3.5 Individual firm strategy

Participation in an eMarketplace is a strategic decision for the firm, involving many related risks such as a poor relationship with the local supplier which might result in poorly filled orders. There are several strategies and methodologies for managing a firm’s participation in an eMarketplace, and these must be a primary part of its overall business strategy. For instance, if a firm identifies collaboration as a primary goal, then using an eMarketplace that supports this activity should be considered. Barney (1986) suggested that organisational culture could be a source of sustainable advantage; firms that do not have the required culture cannot engage in activities that will modify their culture. The culture of an individual firm will influence the choice to participate in an eMarketplace and the type of marketplace (Daniel et al. 2004). Thus, this leads to hypothesis 5 as follows:

**Hypothesis 5 (H5):** An individual firm's strategy positively influences eMarketplace sustainability.

### 2.3.6 Revenue model

The current revenue models of eMarketplaces such as transaction, subscription, membership and licence fee, are often insufficiently viable to maintain the level of income derived from sales. The fees charged by eMarketplaces are usually paid by the supplier, depending on the transactions. The eMarketplace revenue model can be based on a single fee or a combination of fees. An important aspect of the revenue model is the value created by the eMarketplace and perceived differently by each customer (Brunn et al. 2002). This suggests the need to use more than one revenue model as well as configuring a revenue model with the targeted value in mind. Thus, this leads to hypothesis 6 as follows:

**Hypothesis 6 (H6):** Using more than one revenue model positively influences eMarketplace sustainability.

### 2.3.7 Service systems

Systems theory describes an entity as a comprehensive whole with a boundary to distinguish the inside from the outside and to identify the inputs from the outputs (Checkland 1981). Thus, a system considered as a “whole”, has sub-systems and is part of a broader whole. According to Maglio and Spohrer (2008) service systems are the configuration of people, technology, organisations and their interactions and information sharing. An eMarketplace is a service system that interacts with others, with the global economy being the largest service system. For example, an eMarketplace is a “whole” that is a legal entity definable in law.

The eMarketplace takes inputs from buyers/sellers and produces outputs in two categories: products (tangible) and services (intangible). Within this system, there is a variety of sub-systems (e.g. departments). Current eMarketplaces separate these outputs and assumes a dichotomy between them, which implies a different model for each exchange (Lubrica et al. 2011). This separation undermines the buyers/sellers role, and might propose the risk of losing them as a consequence (Stockdale & Standing 2004). A service system, however, removes this separation and engages the buyers/sellers in the process. According to Vargo and Lusch “service is the fundamental basis of exchange” (2008, p. 6). Therefore, service is no longer seen as separate from a product, alternatively, everything in an exchange is considered as a service. Considering a B2B eMarketplace as a service system offers a theoretical basis to study these complex systems, and therefore it is proposed that these systems would be more sustainable. Particularly when embracing the concept of value co-creation, the argument presented leads to the seventh hypothesis:

**Hypothesis 7 (H7):** Addressing the eMarketplace as a service system positively influences eMarketplace sustainability.
2.3.8 Value co-creation

The notion of value has been well studied and extends as far back as Plato’s time 2,000 years ago. There are different definitions of value itself or the creation process. Value as a broad definition has been the central concept in economic theory for a while. Lepak et al. (2007) differentiate two types of value at the organisation level: value in use and value in exchange. Moreover, Haksever et al. (2004) endorse this differentiation and note that things that have high value in use have less value in exchange and vice versa. Scholars emphasise the creation of value for business owners (Porter, 1985), stakeholders (Bourne & Walker 2008; Haksever et al.; Malmi & Ikaheimo 2003) or customers (Lepak et al. 2007). Felin and Hesterly (2007) divided value sources into individuals or collectives, arguing that any theory about value creation must start with the individuals who establish and develop the organisation. Lepak et al. (2007) extended this by adding society as a value source.

Some economists and scholars identify value as being synonymous with price; for example, Porter (1985) defines value as “what buyers are willing to pay” (p. 3). Others provide a broader definition that is more appropriate for this paper. For example, Haksever et al. (2004) define value as “the capacity of a good, service, or activity to satisfy a need or provide a benefit to a person or legal entity” (p. 292). Based on the suggested definitions of ‘value’, value creation depends on the relative amount of value that is subjectively realised by the focus of value creation, whether individual, organisation or society.

The current literature on value creation is often based on Porter’s (1985) depiction of the value chain, which is increasingly being seen as a limited view of organisational activity (Winter et al. 2006). On the other hand, Normann and Ramirez (1993) point out a new perspective that not only creates value for customers, but mobilises them to create their own value from the organisation’s various offerings. Current eMarketplaces have been focusing on creating profits or value in exchange, which has been seen as a limited view (Lubrica et al. 2011) and hinders the role of the buyers/sellers in the process (Stockdale & Standing 2004), and therefore makes it difficult to be sustainable.

Scholars have argued that marketing (Vargo & Lusch 2004), and branding (Merz et al. 2009) is evolving towards value co-creation. We believe that the value co –creation approach is also emerging and evolving in the B2B eMarketplace domain, which highlights the processes, and relationships between all the stakeholders. That is, this value co-creation, or value in use, acknowledges that the role of buyers/sellers is changing from passive to active (Prahalad & Ramaswamy 2004), which allows the value to be co-created at the eMarketplace and its stakeholders when they have different perspectives. Therefore, applying value co-creation concept could bring success to B2B e-marketplaces. Thus, without understanding how to co-create value with all its participants, the chances of eMarketplaces being sustainable are slim. Hence, the following hypothesis seems appropriate:

Hypothesis 8(H8): Co-creating value with participants positively influences eMarketplace sustainability.

3 RESEARCH METHODOLOGY

Most of the existing studies in this area have focused on quantitative approaches for developed countries, although eMarketplaces are a global phenomenon. This is understandable, as eMarketplaces have been the privilege of developed countries because in general, businesses in developed countries can afford the large and complex investments in eMarketplaces which were necessary at that point in time. Therefore, the applicability of their findings to developing countries is doubtful. Nonetheless, with the advance of technology, costs associated with eMarketplaces have decreased. As a result, many businesses in developing countries are able to enjoy the benefits of eMarketplaces, and have started to use them. EMarketplaces offer businesses in developing countries the opportunity to reach global markets easily and to compete on an equal basis (Davis 1999). However, there is consensus that eMarketplace survival rates are lower in developing countries (Laosethakul & Boulton 2007). Many studies have argued that the theories developed in the context of e-business need to be reexamined in the context of developing
countries because these countries might perform under different regulations and economies (Zhu et al. 2003). In light of this, testing the eMarketplaces’ sustainability framework in a developing country such as Saudi Arabia is an important consideration in understanding the global sustainability of eMarketplaces.

Saudi Arabia is situated in the Middle East, a region often considered moderately prepared for the eMarketplace (Alrawi & Sabry, 2009). Saudi Arabia’s experience with eMarketplaces is expected to influence other countries in the region and beyond. Other developing Islamic countries also look to Saudi Arabia for leadership in information and communication (ICT) development because it is a key player in the Islamic world and a founder and key member of the Organisation of Islamic Cooperation (OIC) and the Gulf Cooperation Council (GCC). Therefore, studies on Saudi Arabia can offer important lessons about eMarketplaces in these developing countries. Further, because Saudi Arabia is one of the fastest emerging markets amongst the developing countries (UNSD, 2013), the sustainability of Saudi Arabian eMarketplaces will motivate other developing countries to take action in this area.

To test the proposed framework (Figure 1) and the associated hypotheses, an online questionnaire was developed. Questions were designed on the basis of a critical literature review and prior questionnaires approved for their validity and reliability. Wherever possible, previous items (environmental and organisational), which were tested and proven to be reliable and valid, were adapted from existing research; otherwise, new items (services and operational) and multiple indicators were used to ensure reliability (Neuman 2012). The literature review confirmed the important new items and a total number of 48 items were used in the questionnaire, 3 items are used to measure the regulations factor; 2 items are applied to measure the economic growth factor; 5 items are used to measure participants’ bargaining power at the industry level factor; 3 items are applied to measure the IT readiness factor; 8 items are used to measure the individual firm strategy factor; 5 items are applied to measure the revenue model factor; 5 items are used to measure the service systems factor; whereas 9 items are applied to measure the value co-creation factor.

Prior to the distribution of the questionnaire, a pilot test was conducted in order to improve the reliability of the questionnaire and also to identify possible problems in terms of clarity and accuracy. Feedback from the pilot testing was incorporated and the questionnaire was revised accordingly. Administrators of Saudi Arabian B2B eMarketplaces were asked to indicate their level of agreement and disagreement with each statement to best express their opinion in regard to the variables on a five-point Likert scale ranging from strongly agree (5) to strongly disagree (1) (Garland 1991), aiming at tackling the concepts underlying these variables and tapping all parts of the definition to improve the content validity (Neuman 2012).

Since the target population of this research is the administrators of Saudi Arabian B2B eMarketplaces, the questionnaire was provided in two languages, English and Arabic, and the participants were sent the link to both, although the English language is commonly used by the business sector in Saudi Arabia. After the questionnaire was finalized, it was translated into the Arabic language with the aid of a certified translation office in Saudi Arabia, whose staff are fluent in both languages and the translations were checked by multiple translators from the team. An online questionnaire was used as the means of data collection due to the ease of administration: fast response times, increased response rates, responses are downloadable into a database, and convenience for respondents (Garlau 2007). Singh and Burgess (2007) emphasized that online surveys are the most appropriate method for investigating e-business organisations since they are technology- or Internet-based. The online questionnaire was administered from February 2013 to May 2013 to all the active administrators of Saudi Arabian B2B eMarketplaces. To obtain a high response rate for the questionnaire, a month after sending the initial invitation email, a follow-up email was sent to all participants. Five of the e-mail invitations were returned as undeliverable. Of the total 250 active eMarketplace administrators, 93 replied, representing a response rate of 37.2%, which is comparable to similar research studies in the IS and e-business domains (Hadaya 2008; Rao et al. 2007). The sample was checked for consistency and 8 invalid responses were discarded, resulting in a final dataset of 85 responses.
The final dataset was examined for potential bias by comparing early responses with late ones, using the Chi-Square test as suggested by Armstrong and Overton (1977). This method is commonly used in IS and e-commerce research (Molla & Licker 2005; Saprikis & Vlachopoulou 2012). It uses demographic data (e.g. number of employees) and compares the responses from the first-round survey with the responses from the second round. The participants were divided into two groups: Group 1 (early responses are defined as completion of the questionnaire within the first month) and Group 2 (late responses are completed after this period being motivated by a follow-up e-mail). A comparison was made with respect to three questions concerning demographic data: (1) number of employees; (2) annual sales; and (3) period of participation in the B2B e-marketplace. No such bias was revealed in terms of the number of employees ($\chi^2 = 2.105, df = 3, p = 0.551$), the annual sales ($\chi^2 = 5.272, df = 4, p = 0.260$) and the period of participation in a B2B e-marketplace ($\chi^2 = 3.121, df = 3, p = 0.373$), as the differences between the two groups were statistically non-significant.

The majority of the respondents were CEOs, CIOs and IT managers of the participating eMarketplaces, indicating that they were in a well-informed position to be able to respond to the questionnaire. The use of a top executive’s response as a representative response of an organization is an approach similar to that taken in previous IS research (Molla & Licker 2005). Eighty percent of the participants had between 6-15 years’ experience in eMarketplaces, representing the dot.com survivors who had experienced significant business achievements through their adoption of eMarketplaces, rather than start-up organisations. It is believed that since the majority of participants had this sort of business background, the findings would be more interesting and more widely applicable.

4 DATA ANALYSIS AND RESULTS

The normality of the data distribution was tested before the data were analysed. The skewness and kurtosis values of all factors range from -1.876 to 1.473, which is within the recommend values, which indicate that, overall, the normality assumption could reasonably be accepted (Table 1). According to Hair et al. (2006), Cronbach’s alpha is the most widely used measure of reliability with a range from 0 to 1, and values of 0.60 to 0.70 deemed the lower limit of acceptability, and beyond 0.90 could pose a problem of multi-collinearity (Nunnally et al. 1967). As recommend by Churchill (1979), a Cronbach’s Alpha test was performed first on the factors in order to identify the construct reliability or internal consistency. Table 1 shows that all the factors Cronbach’s Alpha scores range from 0.712 to 0.901, which indicates statistically significant results (Hair et al. 2006). The “Economic growth” factor result of 0.687 could be explained by the small number of items used (two only) as the calculation of alpha is affected by the length of the construct. Therefore, construct reliabilities for all factors are deemed to be sufficient.

After establishing reliability, validity should be assessed by conducting factor analysis. Before conducting factor analysis, the data were tested for appropriateness. Two measures were applied, namely Bartlett’s test of sphericity and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy (MSA). Bartlett’s test of sphericity provides the statistical probability that the correlation matrix has significant correlation among at least some of the items and the recommend value is ($p$-value <0.05). The MSA value must exceed 0.50 for both the overall test and each individual item.
As Table 2 shows, the score of Bartlett's test of sphericity is statistically significant ($p$-value <.000) confirming the statistical correlation among the variables. The result of the Kaiser-Meyer-Olkin measure of sampling adequacy is excellent at 0.870. These measures indicate the suitability of data for the purpose of conducting factor analysis. Convergent validity and discriminant validity were assessed by conducting exploratory factor analysis (EFA). Principal component analysis was performed with the rotation method Varimax with Kaiser Normalization. All items have loadings over the 0.50 cut-off (Table 3), thereby demonstrating convergent validity. Also, all items load stronger on their associated factors than other factors, suggesting good discriminant validity. Thus, the results indicate that the factors can be used to test the framework and the hypotheses of this study. Therefore, the conducted tests enhanced confidence in the data used for the hypotheses testing. Based on the nature of this research and in order to validate the proposed framework, the Pearson correlation test between the independent and dependent variables was performed. The values suggested by Hair et al. (2006) are between 0.30 and 0.80, and the results show that all the coefficient ($r$) values of the independent factors fall between the suggested values, which reveals a statistically significant correlation between each of the independent factors and the dependent factor (Table 4). After confirming the relationship between the independent variables and the dependent variable, the research framework and the hypotheses were analysed using multiple regression analysis. Five of the eight independent factors- value co-creation, individual firm strategy and culture, regulation, service systems, and IT readiness- showed significant influence on the dependent factor, sustainability (Table 5).

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<th>Factor</th>
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<td>Value co-creation</td>
<td>85</td>
<td>3.9863</td>
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<td>-1.876</td>
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<td>.693</td>
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<tr>
<td>(valueCo)</td>
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<td>-1.010</td>
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<td>.803</td>
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<tr>
<td>(IndivFir)</td>
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<tr>
<td>Regulations (Regul)</td>
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<td>.73417</td>
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<td>.712</td>
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<tr>
<td>(RevenMod)</td>
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<tr>
<td>Economic growth</td>
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<td>Sustainability (Sustain)</td>
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</table>

**Table 1. Results of normality and reliability test**

The value co-creation and service systems factors have the highest impact on eMarketplace sustainability in Saudi Arabia with ($\beta$=.319; $p$-value =.000) and ($\beta$=.245; $p$-value =.000), followed by the IT readiness factor, which has a positive impact of ($\beta$=.172; $p$-value =.003). The individual firm strategy factor comes next with ($\beta$=.190; $p$-value =.006), and finally, the regulations factor has an impact of ($\beta$=.211; $p$-value =.007). Therefore, the results were statistically powerful enough to support the following hypotheses:

**Hypothesis 1 (H1):** Awareness of eMarketplace regulations positively influences eMarketplace sustainability. **Hypothesis 4 (H4):** Industry IT readiness positively influences eMarketplace sustainability. **Hypothesis 5 (H5):** An individual firm’s strategy positively influences eMarketplace sustainability. **Hypothesis 7 (H7):** Addressing the eMarketplace as a service system positively influences eMarketplace sustainability. **Hypothesis 8 (H8):** Co-creating value positively influences eMarketplace sustainability.
### Table 3. Results of factors analysis

<table>
<thead>
<tr>
<th>Factor</th>
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<tbody>
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<td>Value co-creation (valueCo)</td>
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<tr>
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<tr>
<td>Regulations (Regul)</td>
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<tr>
<td>Service systems (Serv)</td>
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<tr>
<td>IT readiness (ITread)</td>
<td>.755**</td>
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<tr>
<td>Industry power (IndusPow)</td>
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<td>Revenue model (RevenMod)</td>
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<td>Economic growth (EconoGro)</td>
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</table>

### Table 4. Results of Pearson correlation matrix

<table>
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<tr>
<th>Factor</th>
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<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ValueCo</td>
<td>.319</td>
<td>.000**</td>
</tr>
<tr>
<td>Serv</td>
<td>.245</td>
<td>.000**</td>
</tr>
<tr>
<td>ITread</td>
<td>.172</td>
<td>.003**</td>
</tr>
<tr>
<td>IndivFir</td>
<td>.190</td>
<td>.006**</td>
</tr>
<tr>
<td>Regul</td>
<td>.211</td>
<td>.007**</td>
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<td>RevenMod4</td>
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<td>EconoGro2</td>
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### Table 5. Results of multiple regression analysis coefficients

<table>
<thead>
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<th>Factor</th>
<th>Coefficient Beta</th>
<th>p-value</th>
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<tbody>
<tr>
<td>ValueCo</td>
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<td>.000**</td>
</tr>
<tr>
<td>Serv</td>
<td>.245</td>
<td>.000**</td>
</tr>
<tr>
<td>ITread</td>
<td>.172</td>
<td>.003**</td>
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<tr>
<td>IndivFir</td>
<td>.190</td>
<td>.006**</td>
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<td>Regul</td>
<td>.211</td>
<td>.007**</td>
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<td>RevenMod</td>
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<td>IndusPow</td>
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<td>.557</td>
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<tr>
<td>EconoGro</td>
<td>.005</td>
<td>.930</td>
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</table>
5 DISCUSSION AND CONCLUSION

The results confirmed that five of the independent factors of the framework, i.e. value co-creation, service systems, IT readiness, individual firm strategy, and regulations, are important in relation to B2B eMarketplaces in the Saudi Arabian context, as they were statistically significant, and have a positive influence on the dependent factor, the sustainability of B2B eMarketplaces. The Saudi Arabian B2B eMarketplaces, however, appeared to be less influenced by the other three factors, namely economic growth, participants bargaining power and revenue model. One explanation for the economic growth factor is that Saudi Arabia is one of the fastest emerging markets among the developing countries (UNSD, 2013), and the economy has not been in recession recently. The non-significant outcome of participants’ bargaining power could be because no big players exist in the eMarketplace. Thus, no matter how much bargaining power the buyers/sellers have on their external environment, their effect on the B2B e-marketplace sustainability is low. Saudi Arabian eMarketplace customers may be used to only one type of revenue model (i.e. transaction fee) and are comfortable with it, and hence the low score. Further investigations are required to validate these explanations.

5.1 Research contributions

From a theoretical perspective, this paper is significant because it takes into account the multi-disciplinary aspect of eMarketplace research and investigates alternative theories such as service science theory. This research shows that value co-creation and service systems factors have the highest impact on eMarketplace sustainability in Saudi Arabia, and these factors are core elements in service science theory. From a practical perspective, eMarketplaces have revolutionised the way in which businesses are conducted. They have led to new business models, effective ways of interacting with customers, and opportunities for cost reduction, especially with the advance in technology. EMarketplace IT readiness needs to keep up to date with the industry in which it operates in order to be attractive and sustainable. Governments need to restructure the regulations and involve all the stakeholders and ensure that they are aware of the legislation in order for them to participate confidently. EMarketplace executives need to align the individual firm’s strategy with the eMarketplace in order to improve its functionality, sustainability and profitability over time. The empirical results highlight the importance of five main factors for eMarketplace sustainability with the service science factors being the major factors of sustainability. Hopefully, this study paves the way for other researchers when investigating eMarketplace sustainability in comparison with the existing literature.

5.2 Research limitations and future research directions

A larger sample size containing data from other countries or other regions of the world is needed for a broader generalization of the findings. Investigations could be conducted to cover regions such as the Middle East, the European Union and Asia. Cross-country comparison studies are needed to validate the framework in different cultural and institutional environments in order to identify any needed refinements to the framework. The item measures were subjective in the sense that they were based on Likert-scale responses provided by the participants. Although the proposed framework was assessed for potential biases associated with the survey method, it is better to have more objective measures of the main variable, sustainability. Measurement by objective performance data such as profitability over time would be suitable. A more complete test of the framework would require more comprehensive, longitudinal data with repeated data collections or in-depth case studies over time to further enhance the understanding of eMarketplace sustainability. As five of the eight hypotheses were supported by the study’s findings, they need to be investigated further to determine the dependence between the identified factors in order for the results to be generalised. Lastly, further studies are required to address other factors from the service science literature. This would provide a more holistic view of eMarketplace sustainability and offer additional insights into the field.
6 REFERENCES


